LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER OF SCIENCE IN FINANCE

MASTERS FINAL WORK
PROJECT

EQUITY RESEARCH:

BP PLC

GONÇALO ANTUNES MARQUES

OCTOBER 2019

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SUPERVISOR:

VICTOR MAURÍLIO SILVA BARROS

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Abstract

This Master's Final Work consists of a valuation and consequent recommendation of BP PLC stock, a multinational company listed in the London Stock Exchange, operating in the Oil & Gas Industry.

This report has been developed in accordance with ISEG Master of Finance Final Work standards and written based on the guidelines recommended by the CFA Institute. The main motivation in the selection of the company results from BP PLC being one of the largest players in the industry with a strong presence in the Portuguese market. In addition, there has been a paradigm shift in the sector, justified by the recent transition to a low carbon economy, where a large development of alternative energy sources is foreseen, making the valuation very challenging.

In order to develop this analysis and determine BP PLC price target at the end of 2020, three different methods were applied: the Discounted Cash Flow method; the Discounted Dividend model and the Multiple Valuation model. The first approach meets the reality of the company, taking into account the soundness of its capital structure, the second derives from the stability in dividend payments that BP PLC provides to its shareholders and, the latter proposes based in the analysis of comparable companies in the sector.

Of the above approaches mentioned, the main focus was on the Discounted Cash Flow method, resulting in a hold recommendation with a price target of GBP 5.985 per share, implying a potential appreciation of around 14% against August 30th, 2019 closing price of GBP 5.002 per share. However, it is important to emphasize the high risk inherent in this recommendation, particularly on the volatility that commodity prices have experienced, which has caused constant uncertainty among investors, as well as the possible Brexit effect.

The information and references used in the development of the report are limited to information made available to the public as of August 31st, 2019. Therefore, any subsequent information or events were not taken into account.

JEL classification: G10; G32; G34

Keywords: Equity Research; Company Valuation; Discounted Cash Flows; BP PLC; Oil & Gas Industry.

Resumo

Este Trabalho Final de Mestrado consiste numa avaliação e consequente recomendação da ação da BP PLC, empresa multinacional cotada na Bolsa de valores de Londres (London Stock Exchange), que opera na Indústria de Petróleo e Gás.

O presente relatório foi desenvolvido em conformidade com os padrões do Trabalho Final de Mestrado em Finanças do ISEG e escrito tendo como base as diretrizes recomendadas pelo *CFA Institute*. A principal motivação na seleção da empresa resulta do facto da BP PLC ser um dos maiores *players* na indústria, com forte presença no mercado português. Adicionalmente, tem-se assistido a uma mudança de paradigma no setor, justificada pela recente transição para uma economia de baixo carbono, onde se prevê um grande desenvolvimento de fontes de energia alternativas, tornando a sua avaliação muito desafiante.

De modo a desenvolver esta análise e apurar o *price target* da BP PLC no final do ano de 2020, foram aplicadas três metodologias: o Método dos Fluxos de Caixa Descontados, o Modelo dos Dividendos Descontados e ainda a Avaliação por Múltiplos. A primeira abordagem vai ao encontro da realidade da empresa, tendo em consideração a solidez na sua estrutura de capital, o segundo modelo, deriva da estabilidade no pagamento de dividendos que a BP PLC proporciona aos seus acionistas e, o último assenta numa avaliação baseada na análise de empresas comparáveis do setor.

Das abordagens mencionadas, foi dado especial enfase ao Método dos Fluxos de Caixa Descontados, resultando numa recomendação para manter com um *price target* de GBP 5.985 / ação, implicando um potencial de valorização na casa dos 14% sobre a cotação de GBP 5.002 / ação a 30 de agosto de 2019. No entanto, é fundamental alertar para o alto risco inerente a esta recomendação, com especial foco na volatilidade que os preços das *commodities* têm registado, o que tem provocado uma constante incerteza junto dos investidores, como também no possível efeito *Brexit*.

As informações e referências utilizadas no desenvolvimento do relatório cingem-se a informação pública disponibilizada à data de 31 de agosto de 2019. Desta forma, qualquer informação ou eventos subsequentes não foram tidos em consideração.

Classificação JEL: G10; G32; G34.

Palavras-Chave: Equity Research; Avaliação de Empresas; Fluxos de Caixa Descontados; BP PLC; Indústria de Petróleo e Gás.

Acknowledgements

Being this the last stage of my Master’s degree, I would like to leave a few words of gratitude to several people who have always been present and made it possible to successfully complete this project.

First of all, to Professor Victor Barros for his supervision and for always being available giving important insights and guidance during this long journey.

Secondly, to my colleagues at ISEG, specially to António Calapez Correia, João Duarte Pereira, Pedro Lourenço and Sérgio Sousa, for their companionship and encouragement in the most difficult times.

Thirdly, to my girlfriend Ana Beatriz Silva, for always being by my side and for all the patience she had at the worst times since the beginning of this stage.

Finally, to my family, especially my parents Maria da Conceição Marques and Carlos Marques for their unconditional support and dedication during my entire life, and to my godmother Sílvia Pacheco for all the support and motivation.

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Abbreviations

ADSs – American Depositary Shares
APO – Anglo-Persian Oil company
BBLS – Billions of barrels
BoD – Board of Directors
boe/d – Barrels of oil equivalent per day
BP – BP PLC
CAGR – Compound Annual Growth Rate
CAPEX – Capital Expenditure
CAPM – Capital Asset Pricing Model
CNBC – Consumer News and Business Channel
CRP – Country Risk Premium
D&A – Depreciations and Amortizations
DCF – Discounted Cash Flow
DDM – Dividend Discount Model
DWS – Downstream segment
EU – European Union
F – Forecasted
FCFE – Free Cash Flow to the Equity
FCFF – Free Cash Flow to the Firm
FPT – Formulated products technology
GHG – Greenhouse Gas
GIGS – Global Industry Classification Standard
GTOE – Gigatonne of Oil Equivalent
IOC – Integrated Oil Companies
LNG – Liquefied Natural Gas
mboe/d – Million barrels of oil equivalent per day
mb/d – Million barrels per day
M&A – Mergers and Acquisitions
MRP – Market Risk Premium
NOC – National Oil Company
NYSE – New York Stock Exchange
NGL – Natural Gas Liquids
OBC – Other Businesses and Corporate segment
OPEC – Organization of the Petroleum Exporting Countries
p.p. – Percentual point
PCT – Petrochemical technology
R&D – Research and Development
RFR – Risk-Free Rate
ROS – Rosneft segment
RTE – Refining, technology and engineering
SARD – Sum of Absolute Rank Differences
SoP – Sum of Parts
SOT – Standard Oil Trust
UPS – Upstream segment
US – United States
USA – United States of America
WACC – Weighted Average Cost of Capital
YE – Year-End
YoY – Year-over-Year

Gonçalo Marques (l45187@iseg.ulisboa.pt)
Master in Finance

BP PLC

Oil & Gas Refining

London Stock Exchange

August 2019, Portugal

BP PLC

Date: August 2019
Ticker: BP/ LN (Bloomberg)

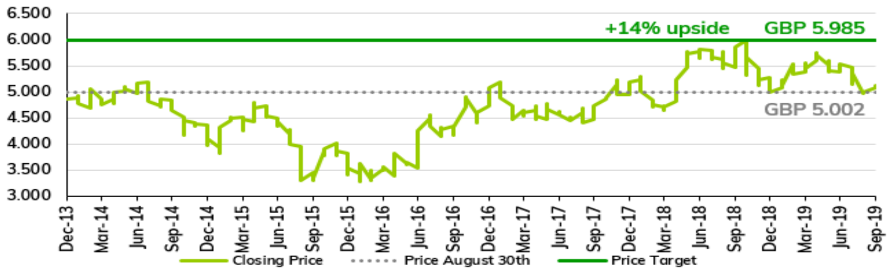
Current Price: GBP 5.002
GBP 1.000: USD 1.23

Recommendation: HOLD (14% Upside)
Price Target: GBP 5.985 (USD 6.88) High-Risk

1. Research Snapshot

BP PLC: Growing the Business and Energy Transition in an uncertainty Brexit Scenario

HOLD is our recommendation for BP PLC (BP) with a 2020YE price target of GBP 6.0/sh using a DCF model, implying a +14% upside potential from August 30th ,2019 closing price of GBP 5.0/sh, although with high-risk. As BP is an Integrated Oil and Gas company, in the face of an unpredictable and constantly changing market environment, BP can ensure sustainable growth by considering the diversification of its business portfolio and adopted strategies.



Source: *Bloomberg data and Author's estimates*

Growing advantaged oil and gas in the Upstream. BP has completed in October 2018 the $10.5 billion acquisition of BHP's US assets. The deal will significantly upgrade BP's US onshore oil and gas portfolio and help drive long-term growth. BP expects to achieve a gradual increase in its oil and gas production by around 190,000 barrels of oil equivalent per day (boe/d) by 2021. The company will benefit from discovered resources in the liquids-rich regions of the Permian and Eagle Ford basins in Texas and in the Haynesville natural gas basin in East Texas and Louisiana. Additionally, BP already started six major projects (Azerbaijan, Australia, Egypt, UK North Sea, Russia and US Gulf of Mexico), making a significant contribution of more 900,000 boe/d of expected new production between 2016 and 2021.

Expanding growth in the Downstream. BP has invested in the expansion of its global retail network and is expected to grow by 0.50% CAGR 2019F-23F. In 2018, BP opened more than 220 retail sites in Germany, increasing to about 1,400 convenience partnership sites. Following the same strategy, BP intends to grow its network in new markets and has increased to around 440 BP-branded retail sites in Mexico and opened its first sites in Indonesia, with the future objective of growing in China. The electrification of cars appears to be a small threat to this strategy.

Looking forward to growth in electric vehicles. The use of electric vehicles is a new trend. By 2040, there could be around 350 million circulating around the world. BP has more than 6,500 charging points across the UK, due to its acquisition (2018) of the UK's largest charging network, forming BP Chargemaster. Additionally, BP has already invested $5 million in FreeWire, a US manufacturer of mobile rapid charging systems for electric vehicles, to respond to the demand for charging facilities, and $20 million in StoreDot, Israeli company that develops ultra-fast charging battery technology for mobile and industrial markets.

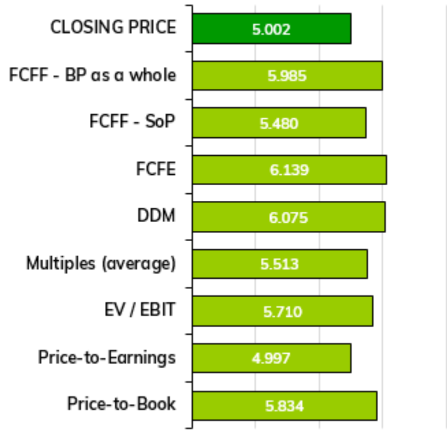
Brexit is (all) about exchange risk. In a Hard Brexit scenario, it is expected a depreciation of GB Pound against US Dollar, resulting in the loss of purchasing power by UK-based citizens and companies. However, BP has the USD as the functional currency and most costs and nearly all sales are incurred in USD. Such events should result in modest adverse impact on the BP's operating margins. Our grey sky scenario points to a loss around 3% in EBIT Margin and a revision in our price target to GBP 4.0/sh. A soft Brexit may, in turn, leverage BP's positioning worldwide and diversification of currency risk to a higher price target (Figure 2).

Table 1: BP market data

Market Profile	
Closing price (August 30th)	5.002
52-week price range	4.814 - 6.036
Average daily volume	30.762M
Shares outstanding	20,102.5M
Market Capitalization	100,553M
Dividend Yield (2018YE)	6.30%

Source: *BP and Bloomberg data (US Dollar)*

Figure 1: BP Price Target



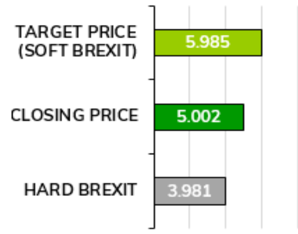
Source: *Author's estimates (GB Pounds)*

Table 2: BP Financials Highlights

Millions of USD	2018YE	2019F	2023F
Total Revenues	298,756	298,068	325,586
Net Profit	9,578	5,535	5,638
Total Assets	282,176	283,101	294,300
Net Debt	43,331	49,002	46,576
Dividend	6,869	6,828	7,676
Net Profit Margin	3.21%	1.86%	1.73%
ROE	9.43%	5.54%	5.75%
ROACE	11.20%	9.24%	11.62%
Dividend Yield	6.30%	6.11%	6.19%
D / E	64.01%	64.71%	66.70%

Source: *BP and Author's estimates*

Figure 2: Hard Brexit impact on BP Price Target



Source: *Author's estimates and analyses (GB Pounds)*

2. Business Description

BP PLC (BP, Bloomberg: BP/ LN), incorporated on April 14, 1909, is a British multinational integrated Oil and Gas company, which holds interest in OJSC Oil Company Rosneft. The company explores for and produces oil and natural gas, refines, markets, and supplies petroleum products, generates solar energy, and manufactures and sells chemicals. Its segments include Upstream, Downstream, Rosneft and Other Businesses and Corporate.
BP is one of the largest oil and gas producer in the world and a top refiner. It is also a major producer of petrochemicals.
The company supplies fuel and related convenience services to consumers in more or less 18,700 BP-branded retail sites worldwide, and operates in 78 countries, with presence in Europe, North and South America, Australasia, Asia and Africa (Figure 3). By 2018YE, BP had a working force of 73,000 employees (Figure 5), reaching $298,756M of Revenues (Figure 4) and $49,319M of EBITDA, corresponding to a 16.51% EBITDA Margin.

In 1882, Amoco emerged in the US from Standard Oil Trust (SOT), American oil producing, transporting, refining and marketing company and monopoly. Later, in 1911, SOT was broken up into 34 independent oil companies, and, in 1985, one of them became Amoco.
In 1901, the future Anglo-Persian oil company (APO) began oil exploration and was incorporated on April 14, 1909. In 1914, the British government took a 51% of APO.
APO, in 1954, started to use the British Petroleum name. From that moment, BP began its strategy of strategic mergers and acquisitions with companies of the same sector. In 1996, BP and Mobil merged, and the British government sold its stake in BP. Two years later, BP merged with Amoco in a $52 billion deal that formed BP Amoco. In 2000, BP Amoco bought ARCO and Burmah Castrol, adopting BP as its main worldwide name. With the objective of expanding its activity at a global level, BP acquired a $1 billion stake in Rosneft (19.75%), the largest oil company in Russia. In 2007, BP announced a new Alternative Energy unit and in 2010, BP acquired Devon Energy's (emerging in Brazil). In the same year, BP reported a $4.9 billion loss as a result of the Gulf oil spill.

Upstream. BP's upstream segment (UPS) generated 9% of 2018YE revenues with a profit of $14,550M. UPS include the activities of exploration of oil and natural gas (including Liquefied Natural Gas (LNG) and Natural Gas Liquids (NGL)), development, production, midstream transportation, storage and processing. In 2018, BP's activities took place in 33 countries with new exploration access of 63,000km^2 and upstream plant reliability of 95.7%.
UPS uses technology based on seismic imaging, enhanced oil recovery (industry average of 35%), wells and facilities using partnering with industry experts and digital upstream (big data technology). Assets are located onshore and offshore and include wells, gathering centers, in-field flow lines, processing facilities, storage facilities, offshore platforms, export systems, pipelines and LNG plant facilities.
UPS strategies are enabled by quality execution, grow oil and gas production and reduce gas emissions, returns-led growth (improve operational efficiency) and new projects by 2021 (35% higher operating cash margins).

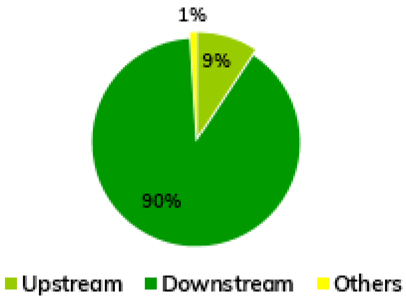
Downstream. BP's downstream segment (DWS) generated 90% of 2018YE revenues with a profit of $7,561M (75% in Fuels, 17% in Lubricants and 8% in Petrochemicals). DWS include the activities of refining, manufacturing, marketing, transportation, and supply and trading of crude oil, petroleum and petrochemicals products. The Company sells refined petroleum products, including gasoline, diesel and aviation fuel. In 2018, DWS comprised 1,400 convenience partnership sites, 94.9% of refining availability and 91% of refinery utilization rate.
BP develops and applies technologies that enhance operational integrity, boost conversion efficiency and reduce emissions. DWS uses three different technology programs according to its activity, more specifically refining, technology and engineering (RTE), formulated products technology (FPT) and petrochemical technology (PCT).
DWS strategies are enabled by safe and reliable operations, advantaged manufacturing (improve competitively advantaged), profitable marketing growth, simplification and efficiency and transition to lower carbon and digitally-enabled future.

Rosneft. BP's Rosneft segment (ROS) generated 1% of 2018YE revenues with a profit of $2,316M. ROS serves as a resource base of hydrocarbons onshore and offshore. Rosneft is the largest oil company in Russia and the largest publicly traded oil company in the world

Figure 3: BP worldwide presence

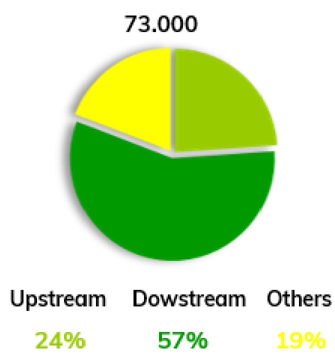
Source: *Company data*

Figure 4: 2018YE Revenues per segment



Source: *Author's estimates*

Figure 5: 2018 YE Employees per segment



Source: *Author's estimates*

Table 3: BP Production (2018 YE)

BP Production	2018 YE
Upstream	-
Liquids	1,268 mb/d
Natural Gas	7,374 mmcf/d
Hydrocarbons	2,540 mboe/d
Downstream	-
Refinery	1,725 mb/d
Marketing sales	2,736 mb/d
Petrochemicals	11,857 kte
Rosneft (BP share)	-
Liquids	923 mb/d
Natural Gas	1,285 mmcf/d
Hydrocarbons	1,144 mboe/d
Others	-
Ethanol-equivalent	765 million litres
Wind capacity	1,001 MW
Solar energy	10 countries

Source: *Company data*

(listed on the MICEX stock exchange in Moscow), based on hydrocarbon production volume, with assets in all Russia's key hydrocarbon regions.

ROS results from the 19.75% shareholding in Rosneft with two directors on the 11-person board and allows BP to benefit from a diversified set of existing and potential projects in the Russia oil and gas sector. Russia has one of the largest and lowest-cost hydrocarbon resource bases in the world and its resources play an important role in long-term energy supply to the global economy.

ROS strategies are enabled by increase total shareholder return and partner with in building a material business outside of the shareholding, participation in the Rosneft Board of Directors, develop and apply technology to improve oil and gas field and refining performing in collaboration with Rosneft, partner with Rosneft to generate incremental value from joint ventures that are separate from BP's core shareholding and collaborate on the provision of technical, HSE (Health, Safety and Environment) and non-technical services on a contractual basis to improve asset performance.

Other Businesses and Corporate. BP's Other Businesses and Corporate segment (OBC) generated a negative impact on less than 1% of 2018YE results with a loss of $1,558M. OBC comprises BP Alternative Energy (biofuels, biopower, wind energy and solar energy), shipping, treasury and corporate activities, including centralized functions and the costs of the Gulf of Mexico oil spill.

BP's strategies on alternative energy are concentrating their efforts in Brazil (one of the most cost-competitive biofuel sources), increase production of biopower by burning bagasse (low carbon power source), continue to optimize BP business of wind energy by seeking out technological advancements and finding ways to deliver power more efficiently and expand its global presence of solar energy by BP's partner with Lightsource, global market leader in the development, acquisition and long-term management of international large-scale solar projects and smart energy solutions (43% share).

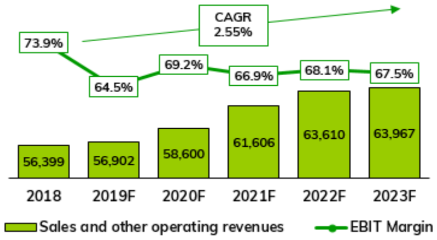
Key Drivers of Profitability. The moment of uncertainty in the global economy has a direct influence on Energy demand and supply. This is implied by the dispute between the major economic powers, such as the influence that OPEC quotas have on the industry.

As a result, BP's performance is highly impacted by fluctuations in commodity prices, directly affecting realization as well as company margins. Regarding production levels, BP faces a constant challenge in finding new oil wells and rehabilitating existing ones. BP has invested in partnerships and the acquisition of onshore and offshore assets, as well as divesting non-core businesses. These have enabled the maintenance and consequent increase in the company's production levels, following the behaviour of its peers (Table 3).

Company's Strategies.

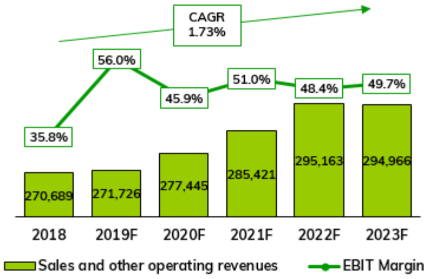
- **Growing gas and oil in the Upstream:** BP intends to invest more in oil and gas, producing both with increasing efficiency. BP has 4 key factors to follow:
  - **Transforming the US onshore:** Purchased assets from BHP in a deal of $10.5 billion, giving access to some of the best basins in the onshore US;
  - **Collaborative partnerships:** BP signed a new production-sharing agreement with SOCAR, Azerbaijan's state oil and gas company, and formed a strategic alliance with Petrobras to explore joint projects in upstream, downstream, trading and low carbon in Brazil;
  - **Project approvals:** Development of projects in Oman, UK North Sea, Trinidad, India, Angola, Gulf of Mexico, Mauritania and Senegal;
  - **Major projects start-ups:** BP started up six major projects, making a significant contribution of 900,000 boe/d of expected new production until 2021.
- **Market-led growth in the Downstream:** BP intends to innovate with advanced products and strategic partnerships. BP has 4 key factors to follow:
  - **Convenience partnerships:** Opened more than 220 sites in Germany, taking the total number of convenience partnership sites to around 1,400 across BP global retail network;
  - **Growing retail in new markets:** Expanded BP network to 440 BP-branded sites in Mexico and opened the first site in Indonesia;
  - **Sustainable aviation fuel:** Entered into an innovative collaboration between Air BP and Neste, a leading renewable products producer, to secure and promote the supply of sustainable aviation fuel;
  - **Strong brands and partnerships:** Strengthened BP lubricants and fuels partnership with Renault Sport Racing.

Figure 6: Upstream segment Financials



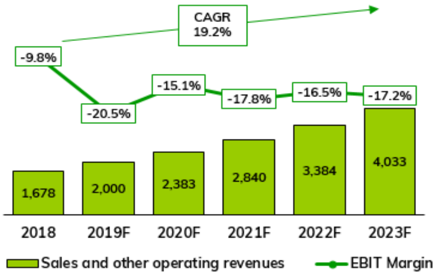
Source: *Author's estimates*

Figure 7: Downstream segment Financials



Source: *Author's estimates*

Figure 8: Other Business and Corporate segment Financials



Source: *Author's estimates*

Table 4: BP's Financial Framework

	Key Target 2018 - 21F	2018 Outcome	
Capital expenditure	$15-17 billion per year	$15.1 billion	✓
Divestments	Around $2-3 billion per year	$3.5 billion	✓
Gulf of Mexico oil spill	Around $2-3 billion per year	$3.2 billion	✓
Gearing	Range of 20-30% for year	30.3%	✓
ROACE	Exceed 10% by 2021	11.2%	✓
Distributions	Progressive dividend and continued share buyback programme	Increased dividend by 2.5% and repurchased 50 million ordinary shares	✓

Source: *Company data*

- **Venturing and low carbon across multiple fronts:** BP intends to pursue new opportunities to meet evolving technology, consumer and policy trends. BP has 4 key factors to follow:
  - **Harnessing battery power:** Investments in electric vehicle technology and infrastructure;
  - **Advancing solar:** Expand its global presence of solar energy by BP's partner with Lightsource;
  - **Turning waste to fuel:** Licensed technology, developed by BP and Johnson Matthey for use at their planned US commercial-scale waste-to-fuels plant;
  - **Cleaner power:** Working with the Oil and Gas Climate Initiative to use natural gas to generate power.
- **Modernizing the whole group:** BP intends to simplify their processes and enhance their productivity through digital solutions. BP has 4 key factors to follow:
  - **Using wearable technologies:** Use smart glasses to help increase safety and efficiency at BP's operations;
  - **Cloud-based technologies:** Reduce the time it could take engineers to diagnose a problem from hours to minutes;
  - **Intelligent operations:** APEX technology across all upstream BP-operated assets to help identify efficiency improvements;
  - **Process automation:** Using robotic process automation to help to optimize business processes, drive productivity and improve customer satisfaction.

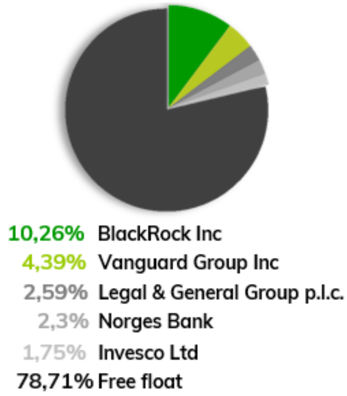
Figure 9: BP's Credit Profile

Rating Agencies	Rating
Moody's	
Outlook	STABLE
Long Term Rating	A1
Standard & Poor's	
Outlook	STABLE
Long Term Rating	A-
Fitch	
Outlook	STABLE
Long Term Rating	A
DBRS	
Outlook	STABLE
Long Term Rating	A

Source: *Bloomberg data*

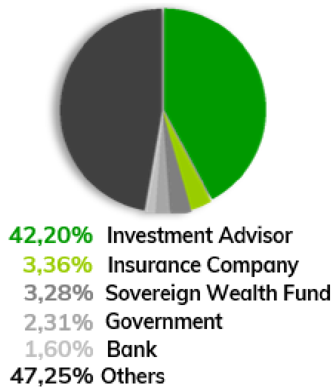
Shareholder Structure. BP presents a diversified Shareholder´s Structure with 20,102.5 million of shares outstanding. BP's largest shareholder is BlackRock, Inc, an American global investment management corporation, with a 10,26% ownership position. Vanguard Group, Inc, an American registered investment advisory, is the second-largest shareholder with 4,39%. The third-largest with only 2,59% ownership is Legal & General Group PLC, a British multinational financial services company (Figure 10).
BP's main shareholders are Investment Advisors who hold Oil & Gas Exploration & Production ETF's. Accordingly, they are considering passive investments, having no direct intervention in BP management (Figure 11).
BP ordinary shares are traded publicly on the London Stock Exchange and the Frankfurt Stock Exchange. BP American Depositary Shares (ADSs) trade publicly on the New York Stock Exchange (NYSE) and one BP ADS represents ownership rights in six BP ordinary shares.

Figure 10: Shareholder's Structure



Source: *Bloomberg data and Author's estimates*

Figure 11: Shareholder's by Institution Type



Source: *Bloomberg data and Author's estimates*

3. Management and Corporate Governance

Mr. Helge Lund was elected BP's Chairman of the Board on January 1st, 2019, succeeding Mr. Carl-Henric Svanberg. He joined the Board in July 2018 and he has a wide background with 10 years of experience with BG Group as President & CEO and executive positions on Aker Kvaerner, Aker RGI and Hfslund Nycomed. Mr. Bob Dudley joined Amoco Corporation in 1979 and became general manager strategy in 1999. Currently, he is BP's CEO since October 1st, 2010. In March 2013, he was appointed as director of Rosneft and since 2016, he has chaired the OGCI. Mr. Brian Gilvary is the CFO since January 1st, 2012. He joined BP in 1986 after obtaining a PhD in mathematics. Thought his career he was director of TNK-BP and served on the HM-Treasury Financial Management Review Board (Table 6).

Board Structure and Attendance. There are 14 seats on the Board of Directors with 76.9% independent, above of both the generally accepted standard of 66% (Wall Street Journal) and 72% (Standard & Poor's). However, it is below the peer average of 82.8%. BP's ISS Quality Score is 2, putting the company above its peers with an average of 5.5 (Table 5). ISS analyses over 200 factors, divided into four pillars (board structure, compensation/remuneration, shareholder rights, and audit & risk oversight). It has a scale of 1 to 10, where 1 indicates relatively higher quality governance practices. The key factors that contribute to BP's score include board meeting attendance of 98%, considerably high, being at the level of peer's average of 98% too. Also, BP's remuneration policy that is based on 4 pillars (simplification, reduced package versus previous policy, link to strategy and stewardship) and subdivided into 3 distinct categories (Executive Directors, Non-executive Chairman and Non-executive Directors).

Table 5: Governance Metrics

Metric	BP	Peer's Average
ISS Quality Score	2,0	5.55
ESG Disclosure Score	69.71	56.95
% Independent Directors	76,92	82,77
% Board Meeting Attendance	97,97	97,54
% Women on Board	23,08	39,01

Source: *Bloomberg data and Author's estimate*

Corporate Governance. BP follows the Anglo-Saxon corporate governance model (Figure 12) where shareholders in attendance at the General Meeting elect all directors each year:

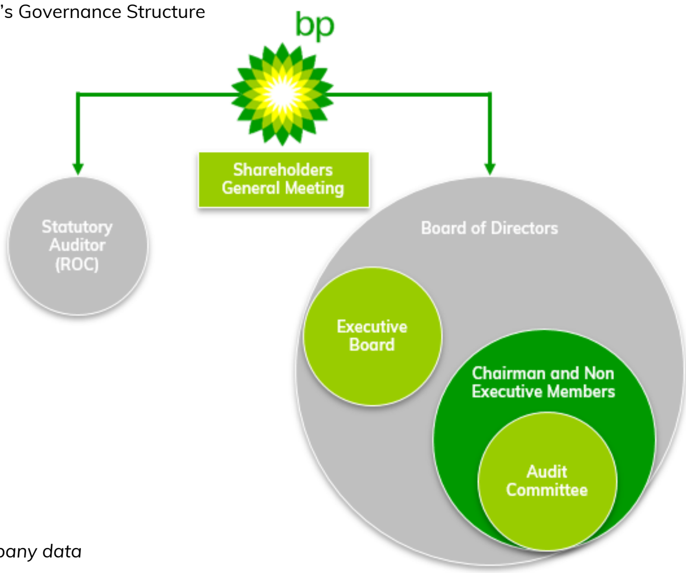
- **Board of Directors** – responsible for monitoring BP's performance, identify the principal risks and uncertainties and control them, Board and executive management succession.
- **Audit Committee** – 4 members responsible for monitoring the effectiveness of the group's financial reporting, internal control systems and risk management systems. Deloitte was appointed for the statutory audit, with effect from 2018.
- **Safety, ethics and environment assurance committee (SEEAC)** – 7 members responsible for looking at the processes adopted by BP's executive management to identify and mitigate significant non-financial risk.
- **Remuneration Committee** – 6 members responsible for determining and recommending to the board the remuneration policy for the chairman and executive directors.
- **Geopolitical Committee** – 7 members responsible for monitoring the company's identification and management of geopolitical risk.
- **Chairman's Committee** – Composed by all non-executive directors responsible for providing a forum for matters to be discussed.
- **Nomination Committee** – 6 members responsible for ensuring an orderly succession of candidates for directors and the company secretary.

Table 6: BP's Board members

Name	Position
Helge Lund	Chaiman
Bob Dudley	Group chief executive
Brian Gilvary	CFO
Nils Andersen	Non-executive director
Admiral Frank Bowman	Non-executive director
Pamela Daley	Non-executive director
Alan Boeckmann	Non-executive director
Dame Alison Carnwath	Non-executive director
Ian Davis	Senior director
Dame Ann Dowling	Non-executive director
Melody Meyer	Non-executive director
Brendan Nelson	Non-executive director
Paula Rosput Reynolds	Non-executive director
Sir John Sawers	Non-executive director

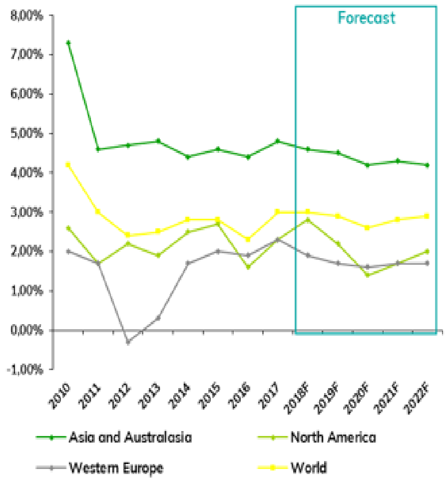
Source: *Company data*

Figure 12: BP's Governance Structure



Source: *Company data*

Figure 13: World Real GDP (2010 Constant Prices)

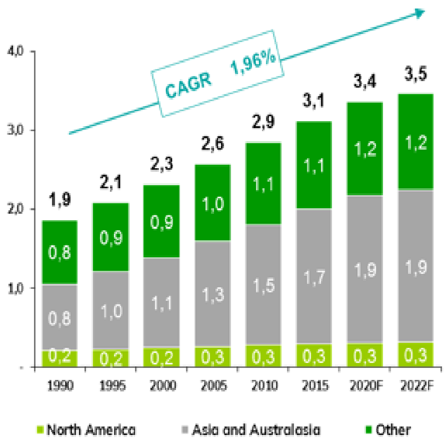


Source: *Economist Intelligence Unit*

BP complied throughout 2018 with 96.4% of provisions of the UK Corporate Governance Code, which is based on the principles of Leadership, Effectiveness, Accountability, Remuneration and Relations with Shareholders. BP's ESG Disclosure Score is 69.71, considerably higher than the peer's average of 56.95. These metrics have a range of 0 to 100, that measure transparency, the more information disclosed, the higher the disclosure score.

BP has three types of shares: ordinary shares, that represent 99.58% of the total issued nominal share capital of the company (excluding shares held in treasury), with the one-share-one-vote principle; preference shares, that represent 0.42%, with the one-share-two-votes principle; and ADS that represent ownership rights in six BP ordinary shares. The company's major shareholders do not have different voting rights, and this principle protects minority shareholders by giving them the same voting rights for candidates for the Board and the right to receive dividends.

Figure 14: World Total Population (billion people)



Source: *Economist Intelligence Unit*

Sustainability and Social Responsibility. BP is a company that already has more than two decades of taking actions on climate change and active participation on several initiatives with the concern in the reduction of emissions. In 2018, BP implemented its Advancing Low Carbon accreditation programme, supported by 6 initiatives and specifically designed to encourage every part of BP to pursue lower carbon opportunities (Appendix 17).

BP's sustainability strategy highlights three main areas: reducing emissions in operations, including zero net growth in operational emissions out to 2025, 3.5Mte of sustainable greenhouse gas (GHG) emissions reductions by 2025, and with targeting methane intensity of 0.2% and holding it below 0.3%; improving BP's products, by providing lower emissions gas, developing more efficient and lower carbon fuels, lubricants and petrochemicals, and growing lower carbon offers for costumers; and creating low carbon businesses, by expanding low carbon and renewable businesses, with $500 million invested in low carbon activities each year, and collaborating and investing in the Oil and Gas Climate Initiative's.

4. Industry Overview and Competitive Positioning

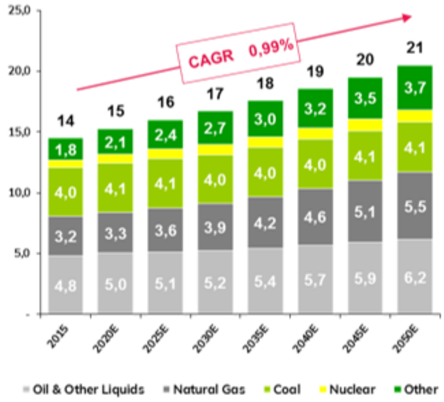
World Economic Outlook.

Stable world economic GDP growth. In the aftermath of the sovereign crisis in the early 2010's, the world real GDP growth has been on a recovery path. There was a slight growth from 2.40% in 2012 to 3.00% in 2017. World real GDP growth is expected to range from 2.60% to 3.00% between 2018F and 2022F, mainly explained by Asia and Australasia (Figure 13). However, OECD countries real GDP growth is expected to slightly decrease (1,40% in North America vs 1,60% in Western Europe, in 2020F).

World Population Growth. World Population is expected to increase to 3.5 billion people in 2022F, resulting in a +2% CAGR, between 1990 and 2022F, mainly explained by the Asian and Australasian regions, increasing from 0.8 billion people to 1.9 billion people (Figure 14).

Demand for Primary energy. The demand for energy consumption is projected to increase over the next 30 years. Thus, it is expected to grow to a CAGR of 0.99%, from 14 to 21 gigatonne of oil equivalent (GTOE). This increase is mostly justified by population growth and the economic development in non-OECD countries (Figure 15).
There has been a recent transition to a low carbon economy through the development of new sources of energy, particularly renewables. However, its impact is expected to take time to penetrate the market, making Oil & Gas the world's leading primary sources of energy (56% in 2015 vs 57% in 2050F).

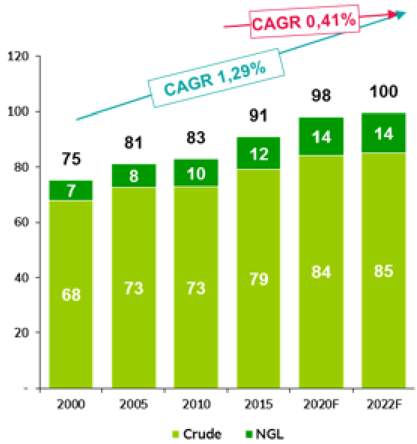
Figure 15: World Primary energy consumption. Forecast by source (GTOE)



Source: *USEIA – International Energy Outlook 2017*

Stable production of Crude Oil, with a slightly predicted growth. In the recent past, between 2000 and 2015, Crude Oil and NGL production has increased considerably from 75 to 91 million barrels per day (mb/d). In the year 2022F it is expected to reach 100 mb/d, corresponding to a CAGR of +0.41%. This is due to the hegemony of OPEC countries, with a market share of 42% in 2017 (Figure 16).
Considering this and developments in consumption and production of Crude Oil, Brent prices are expected to grow at CAGR of +4.14 and the US Henry Hub to a CAGR of 3.05% (both between the period 2015-2022F).

Figure 16: World Crude Oil and NGL Production (MB/d)



Source: *Rydstad Energy*

The rise in Crude Oil Price influenced by political instability. The global uncertainty of the international supply accompanied by the low growth of oil inventories (0,11% CAGR between 2012-2017) caused an increase in the crude oil price since the collapse of the price in 2014 ($/BBL 52 in 2015 vs. $/BBL 54 in 2017). The determining factor is geopolitical instability, namely the production cut in Venezuela and the possibility of economic sanctions imposed by the USA. As a future trend, it is expected an increase of the price from the $/BBL 54 in 2017 to $/BBL 70 in 2022, as OPEC members have recently agreed to decrease production by about 1mb/d (Figure 17).

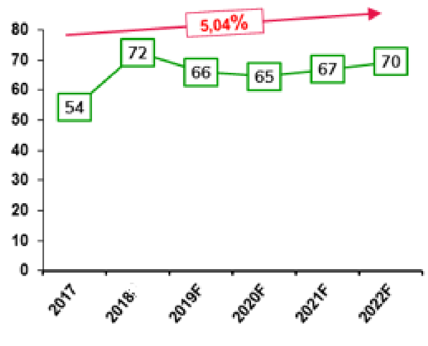
The risk of Hard Brexit.

Instability in Brexit Agreement. Brexit is an abbreviation for "British exit", a term used when referring to UK's decision to leave the EU. On June 23rd, 2016, the British people were asked whether the UK should stay or leave the EU. The majority (52% of voters) decided that the country should leave, however, this did not happen immediately.
In March 2017, this decision was notified to the EU, and according to Article 50 of the Lisbon Treaty, once communicated, the withdrawal would take place two years later. However, this was not the case as during this period the exit agreement of former British Prime Minister Theresa May was rejected three times in Parliament. The agreement defined the following three points:

- **i)** UK would have to pay to EU around GBP 39 billion for breaking the partnership contact;
- **ii)** Specific rules defining the consequences for British and European citizens living in and outside the UK;
- **iii)** Question to avoid a closed frontier between Northern Ireland (which is part of the UK) and the Republic of Ireland (EU independent country).

The agreement also provided for a transitional period until December 31st,2020 for the UK and the EU to formulate a trade agreement to prevent sudden and unattached exit. The main reason for the rejection in Parliament is justified by the uncertainty over the possible political tension regarding the frontier between Northern Ireland and Republic of Ireland (marked by conflict for three decades in the past).

Figure 17: Brent historical and forecasted Prices (USD/BBL)

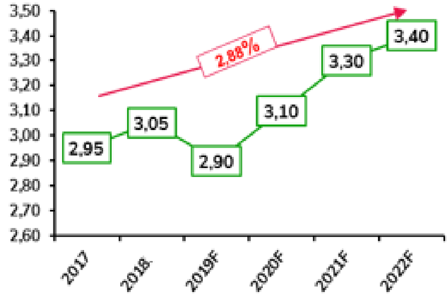


Source: *BP Annual Reports, Bloomberg, Deloitte forecast and EIA forecast*

The successive failures in Brexit's driving led Theresa May to leave in June 2019, being the second after the David Cameron. As such, Boris Johnson was elected, determined to take Brexit forward with or without agreement.

Faced with the imminent risk of a Hard Brexit, 27 European leaders agreed on the postponement of the UK exit deadline, easing the threshold originally set by Article 50. Regarding that, in September 2019, a law was passed in the British Parliament preventing a Brexit without agreement, requiring a new deadline. Therefore, the next deadline will be October 31st, 2019, in which case Brexit will make UK the first member state to leave the EU.

Figure 18: U.S. Henry Hub historical and forecasted Prices (USD/BBL)



Source: *BP Annual Reports, Bloomberg, Deloitte forecast and EIA forecast*

Severe economic uncertainty. The occurrence of a Hard Brexit would mean leaving UK without the possibility of a transitional period, severing relations with EU overnight. Such an event will bring serious economic consequences. The IMF predicts that a non-deal exit scenario could knock between five or eight percentage points off Britain's GDP and threaten the global economy.

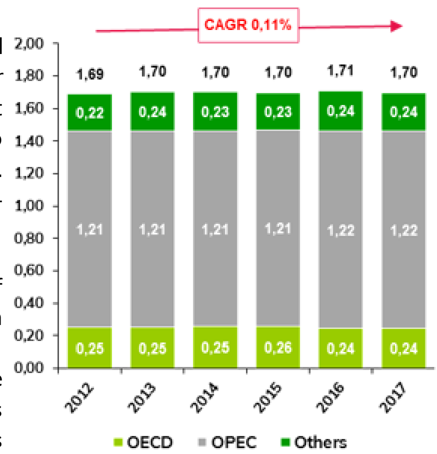
In addition, two serious consequences are expected:

i) Hit to Corporate Profits. With a Hard Brexit, trade will suddenly switch to World Trade Organization terms, raising tariffs and customs checks overnight. Thus, more expensive imports coupled with the expected depreciation of the country's currency will inevitably increase inflation levels. This scenario would weigh on Corporate profits, reduce consumer purchasing power and potentially destroy the British economy.

ii) Pressure on Financial Contracts. A major concern remains in the possible shortage of labour by EU citizens and in London's status as a global financial center. Banks and financial services companies operating outside the capital of the country are moving to Europe for fear that their ability to serve customers outside UK may be undermined.

Given this scenario of constant uncertainty, Martin Gilbert, chairman of Aberdeen Standard Investments, on June 6th, 2019, assigned a percentage of 60% for a Hard Brexit. This number was motivated by two successive events, firstly the imminent exit of Theresa May without reaching agreement in the British parliament; and, secondly the unwillingness of the EU to negotiate with the new prime minister, given the failure carried out by Theresa May. Regarding with that, recent declarations by Boris Johnson state that the UK's chances of no-deal Brexit are "a million-to-one against".

Figure 19: World Crude Oil Reserves (Trillions of Barrels)



Source: *Company Filings and BP Annual Statistical Report*

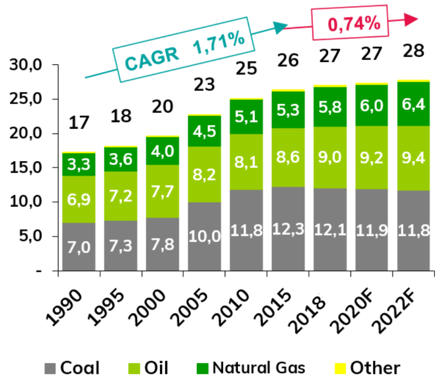
Global Oil & Gas Industry Overview. Oil & Gas Industry includes global processes of exploration and extraction (upstream), transportation and commercialization of petroleum products (midstream), as well as refining (downstream).

The market structure is an Oligopoly composed of a small set of large players that influence the direction of the market and by a group of small companies conditioned by them. Oil & Gas Industry life cycle is mature, in which market is expected to grow slowly but presence of its players is high (Appendix 18). In terms of business cycle, it presents a cyclical activity that ranges between 7 and 9 years (Appendix 19), considering the correlation between the sales growth rate of the two largest US players and real GDP USA growth (correlation coefficient amounting to 46%).

Industry marked by high volatility in Commodities Prices. One of the major challenges facing the Oil & Gas industry is related to the relationship Production vs Price. Historically, there has been a decrease in the new reserves discovery with economic viability between 2010 and 2017. Regarding with that, the number of global Crude Oil reserves has decreased from 1.707 billions of barrel (BBLS) in 2016 to 1.697 BBLS in 2017 (Figure 19).

With the collapse of the prices from 2010 ($/BBL 80) to 2015 ($/BBL 52), there was a decrease in the growth rate of gross fixed investment from 11% in 2010 to 3% in 2015 (Figure 22). The estimates point for the lower rate to persist (stable growth rate at 3% YoY from 2015 to 2022).

Figure 20: Total CO2 emissions from fuel combustion (Mt of CO2)



Source: *Economist Intelligence Unit*

Paris Climate Change Agreement and Legal changes. In the recent past, there has been a growth in total C02 emissions due to coal and other sources of fuel combustion including industrial waste and non-renewable municipal waste. The Paris Climate Change agreement was celebrated following the growth of total CO2 emissions from fuel combustion by a CAGR of 1.71%, between 1990 and 2015. Therefore, total CO2 emissions from fuel combustion, are expected to increase at a slower CAGR rate of 0.74%, between 2015 and 2022F (Figure 20). This forecast is result from incentives of governments to lower taxes on renewable energies and raising taxes on fuel combustion sources of energy.

Additionally, on the demand side, the traditional metal-based materials used in the new generations of airplanes were replaced by resistant fibres that are made with oil-based resins.

Higher M&A activity. The Oil & Gas Industry is conducive to a higher M&A activity, and a new wave of opportunities has appeared. Between 2015 and 2017, the five largest IOC, by market cap, increased from 168 to 186 deals (Figure 24). The main key drivers for this evolution were:

- **i)** value chain integration;
- **ii)** economies of scale;
- **iii)** technology / digital;
- **iv)** distress (means of survival for companies with large debt burdens in a significantly oversupplied market);
- **v)** increased difficult on the access to capital markets.

In short, M&A activity is a strategy undertaken by the largest players to quickly adapt to changes in the sector.

Portfolio Optimization and disruptive technological changes. A future trend is also the portfolio optimization, that is, several contractors and service providers already planning divestments of non-core divisions. Additionally, the USA Corporate Tax Cut from 31% to 25%, and the higher flexibility in the repatriation of profits overseas is expected to have major impacts in the profitability of the US Companies in the industry.

In less than a decade, there was a major technological change on the supply and demand sides of the industry, by the combination of directional drilling and hydraulic fracturing ("fracking").

The changing energy mix. Energy consumption has experienced a paradigm shift associated with industry electrification and the increasing demand for renewable energy sources. Regarding that, two distinct scenarios are foreseen (Appendix 20):

- **i) Evolving transition** – This scenario assumes that government policies, technology and social preferences continue to evolve in a manner and speed seen over the recent past. Thus, it is expected that world energy demand increases by one third from 2017 to 2040; CO2 emissions from energy increase by 7% by 2040; and, oil and gas account for more than half of global energy in 2040.
- **ii) Rapid transition** – This scenario is consistent with the Paris goals, and is broadly like the reduction in carbon emissions in the EIA's Sustainable Development Scenario. Thus, is expected that oil demand in 2040 decreases by 14Mb/d and Biofuels grow by 4Mb/d; CO2 emissions decline by around 45% by 2040; and, global energy consumption grows by around one fifth.

Additionally, the use of electric vehicles is expected to increase and, by 2040, there could be around 350 million circulating around the world. Currently, only about 1% of cars int the world are fuel type electricity. However, by 2025 this figure is expected to increase to about 5%. From then on, a large growth is projected, reaching in 2040 31% of electric vehicles (Appendix 21).

Key Drivers of Industry Profitability. Price (driven by supply and demand) is the Oil & Gas industry most relevant profitability driver, conditioning the level of return. Nevertheless, this is also the most difficult driver to manage, because it is an input from the market. Given this, companies can only act over it by taking long-term contracts or developing a hedging strategy with derivatives.

In addition, price dictates which rigs are profitable, conditioning the production volume and stating the importance of rig portfolio management.

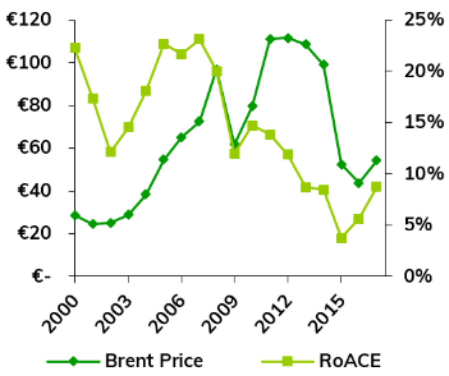
Besides that, to be profitable and create value, companies can lever other value drivers along the value chain, such as refinery yield, flexibility and refining margins, among others.

Major players in the Oil & Gas industry also add enterprise value, through synergies captured over the value chain, by adopting an integrated operating model.

Among Peers, looking upward. Industry peers were selected based on the Bloomberg Integral Oil Companies (IOC Group). This Group comprises the companies that operate in the three levels of the value chain (i.e. upstream, midstream and downstream) and are publicly traded. We have selected the five largest IOC in the group by market cap and by production level, i.e., Exxon, Chevron, BP, Royal Dutch Shell and Total.

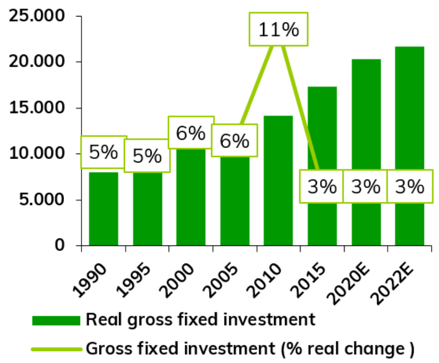
These companies share common strategies, namely:

Figure 21: Brent Price vs RoACE



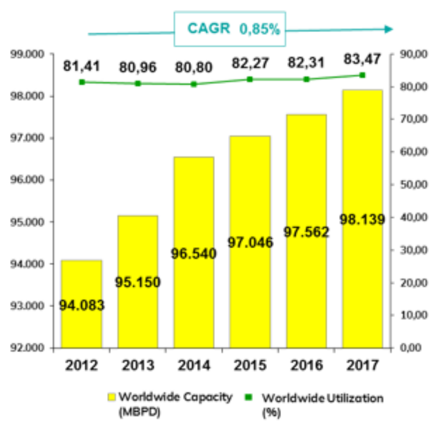
Source: *Bloomberg data*

Figure 22: Gross fixed investments



Source: *EIU analysis and Author's analysis*

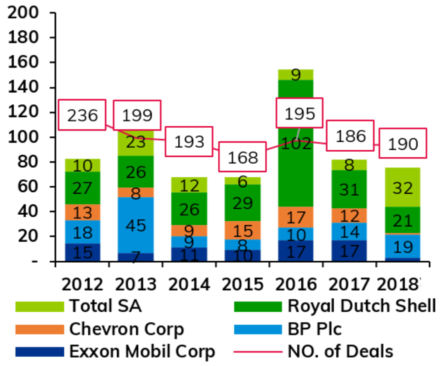
Figure 23: Worldwide Capacity and Utilization



Source: *Bloomberg data*

i) Diversification in emerging markets;
ii) M&A, strategic agreements and partnerships;
iii) Business models integration;
iv) Portfolio optimization;
v) Increase in production;
vi) Raise profits and returns;
vii) Maximize value from technology.

Figure 24: Top 5 IOC M&A activity (#deals and $B)



Source: *Global Data's Deals and Alliances Profile*

BP Competitive Positioning. In order to assess BP's strategic position in the Oil & Gas Industry, we presented a Positioning Matrix (Figure 25) comparing the 5 largest identified IOCs, assessing ROCE by production level, two of the industry's leading comparison indicators. Additionally, we performed a Porter's Five Forces analysis (Figure 26), as well as a SWOT analysis.

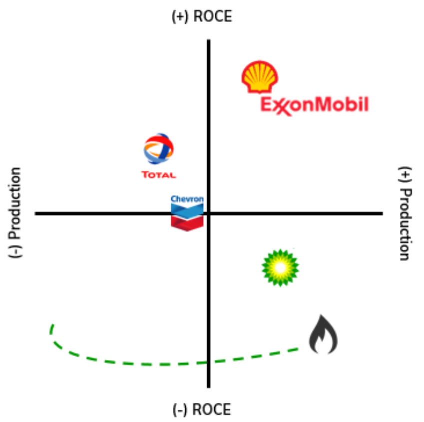
Porter's Five Forces analysis.

Threat of new entrants | LOW

The entry of new players in the market is a relatively low threat, considering the characteristics of the industry, that require the following:

i) Industry economies of scale – To operate in the market, a high level of production is required to achieve break-even and dilute the infrastructure fixed costs;
ii) High Capital requirements – At every stages of the value chain, a high level of investment is required. Starting with the Exploration activity, where investment does not always guarantee return, passing to Refining through large facilities and ending up in Research & Development (R&D), where technology innovation capacity prevails;
iii) Difficult access to distribution channels – Practically all distribution channels are dominated by the industry's largest players, making it difficult to access newcomers;
iv) Restrictive government policies – Highly regulated industry restricted to the generation of new production licenses, protecting the interests of the actual players;
v) Expected retaliation from actual players – The industry's biggest players have a huge financial capacity to outperform any newcomer strategy, having a long history of M&A processes.

Figure 25: Positioning Matrix



Source: *Bloomberg data and Author's analysis*

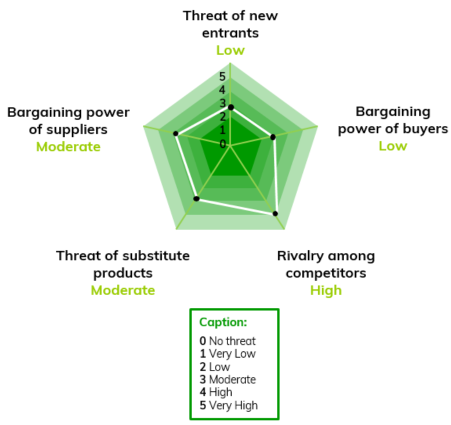
Bargaining power of suppliers | MODERATE

Given that most players have a vertically integrated value chain, the most relevant suppliers are oil producer countries. In the industry there are no alternative substitute products, increasing dependence on oil producers. States have the power to allocate exploration and production licenses and, in many cases, cartels are formed allowing them to acquire a major market share. Regarding with that, oil producer countries might integrate forward in the value chain, creating a National Oil Company (NOC) to explore their own national resources.
However, this bargaining power on the part of suppliers may be affected. A possible disruption in a cartel organization could set a precedent of instability (e.g. Qatar exit from OPEC). Another threat is directly linked to political tension and economic sanction (e.g. Syria and Iran). Finally, many countries have a huge dependence on oil exploration for their financial stability.

Bargaining power of buyers | LOW

Considering the characteristics of the industry, it can be said that the bargaining power of buyers is relatively low. There is a massive group of different kinds of buyers, comprising since single costumers (e.g. refined products), to industries (e.g. petrochemical) and state companies (e.g. gas contracts). The existence of vertical integration along players' value chain, along with cartelization, gives companies a higher bargaining power than consumers. The determined market price is the result of a match between supply and demand, with the top 3 quotes being the Brent Blend, the West Texas Intermediate, and the Dubai/Oman. Associated with this, as there is no viable solution for a massive alternative product substitution, it makes the consumer not price sensitive. Lastly, high costumer switching costs, since the changing of oil & gas to another energy source is expansive and only possible in the long run.

Figure 26: Porter's Five Forces



Source: *Michael E. Porter framework (2008) and Author's analysis*

Threat of substitute products or services | MODERATE

The current paradigm of the threat of substitute products is relatively low. There is no viable solution to a massive replacement of plastic and petrochemicals in the world. Some of actual energy sources are likely to lose importance in the global energy mix, associated with environmental and political reasons, such as the impact of coal on CO2 emissions.

However, the threat of substitute products tends to increase in the mid-term, with the search and development of alternative fuels (e.g. ethanol from Brazil), as well as, the expansion in renewable energy production (associated with the transition to a low carbon economy).

Rivalry among existing competitors | HIGH

Oil & Gas Industry is a mature oligopoly, where the intensity of rivalry between competitors is high. There are a considerable number of players on the market, some of which are relatively similar in size and power (e.g. top 5 IOC). Given that the industry is growing, especially with the existence of a new market to exploit renewable energy, players are expected to increase their rivalry in search of additional market share.

It should also be noted that products have little or no differentiation and exit barriers ate high given the costs of stopping production, for example, costs of shut down a well or to abandon a refinery.

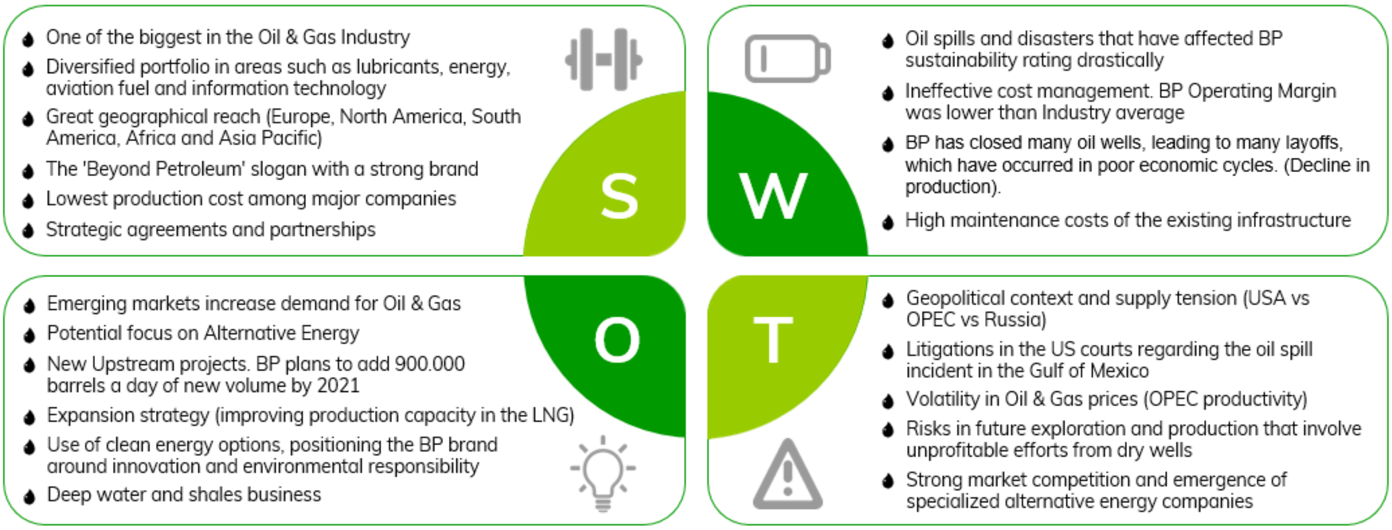
However, the level of competition can be compensated through the differentiation strategies of each player. There is no competition in price, since it is formed by the market. So, companies try to differentiate by their brand power and services delivered.

Table 7: DCF Price Target

BP AS A WHOLE	g	USD
(+) Enterprise Value	1.25%	192,793
(+) Non-operating assets		46,757
(-) Non-operating liabilities		51,585
(+) Cash and cash equivalents		22,523
(-) Debt (Gross Debt)		70,579
(-) Non-controlling interests		1,552
(=) Equity Value		138,356
Number of shares outstanding		20,102,443,000
Price target YE (US$)		6.88
Price target YE (GBP)		5.985

Source: *Author's estimates*

Figure 27: BP's SWOT Analysis



Source: *Author's analysis*

5. Investment Summary

We issue a HOLD recommendation on BP with a 2020YE target price of GBP 5.985/sh using a DCF model, representing a +14% upside potential to the company's stock price of GBP 5.002/sh at August 30th, 2019, but with high risk.

We attribute the company's undervaluation to excessive investor pessimism due to the recent drop in price in line with the entire global stock market (Figure 28). The crude prices have fallen about a fifth from 2019 highs hit in April, partly because of worries that the trade war, between USA and China, is impacting the global economy and oil demand.

Despite the predictable effect of Brexit on the falling GBP/USD quote due to the lack of time to prevent a no-deal Brexit, which increases uncertainly causing a short-term weakness in share price, BP CEO has already announced that the company will remain in the UK.

However, crude price recovery is expected, with an average forecasted price 2019F-23F of $68.00. The growing advantaged oil and gas in the Upstream, the Market-led growth in the Downstream, and a strong and diversified portfolio, accompanied by a strong dividend policy, opens room for an increase in the share price. We must take into consideration the uncertainty related to Hard Brexit and the possible effects on the company's operating results.

In short, BP is a company with growth potential, especially in an energy transition environment. Nevertheless, there is uncertainty regarding its upside potential motivated by the impact of Brexit.

Table 8: BP's WACC

DCF Analysis - BP AS A WHOLE	2020F	Terminal
Cost of Equity		
Risk Free Rate (RFR)	1.32%	1.32%
Company's Beta (β)	1.29	1.29
Country Risk Premium (CRP)	0.38%	0.38%
Market Risk Premiun (MRP)	6.08%	6.08%
Cost of Equity	9.55%	9.55%
Cost of Debt		
Risk Free Rate (RFR)	1.32%	1.32%
Default Spread Company	1.56%	1.56%
Default Spread Country	0.69%	0.69%
Cost of Debt	3.57%	3.57%
Marginal tax rate	40.00%	40.00%
After-tax Cost of Debt	2.14%	2.14%
Weight of Equity	63.39%	62.00%
Weight of Debt	36.61%	38.00%
WACC	6.84%	6.73%

Source: *Author's estimate*

The recent acquisition of BHP's US assets in a deal that will significantly upgrade BP's US onshore oil and gas portfolio and help drive long-term growth. This deal will allow BP to achieve by 2021 a gradual increase in its oil and gas production by around 190.000 boe/d.

BP started up six major projects in UPS, with a global presence (Azerbaijan, Australia, Egypt, UK North Sea, Russia and US Gulf of Mexico), making a significant contribution to the 900.000 boe/d of expected new production between 2016YE and 2021F. This investment allows BP to increase its total production from 5,078 million barrels of oil equivalent per day (mboe/d) to 5,504 mboe/d (increase of 2.72% CAGR 2018YE-21F). This, coupled with the positive outlook for the crude price recovery, permits BP to increase its average realization in liquids, natural gas and hydrocarbons, resulting in an increase of its revenues 2019F-23F by +12.4pp.

BP's constant investment in the expansion of its global retail network has allowed its Downstream businesses to penetrate new markets. In 2018, BP opened more than 220 retail sites in Germany, increasing to about 1,400 convenience partnership sites. Following this strategy, BP intends to grow its network, having increased to around 440 BP-branded retail sites in Mexico and opening its first sites in Indonesia, with the future objective of growing in China. This investment allows BP to have an expected growth on its retail sites of 0.50% CAGR 2019F-23F, resulting in an increase of its revenues of Marketing, spot and term sales of refined products by +8.6pp.

BP has a clear policy of paying dividends to shareholders, aiming to ensure a progressive dividend policy. BP has a current 6.30% dividend yield, relatively stable over the last 6 years, ranging from 5.70% - 7.50%. This value is justified by a historically paid 40.00 cents average dividend per share, concluding that BP will always pay dividends to its shareholders, even when it gets a negative EPS (example in 2015). In addition, BP offers a scrip dividend programme which enables ordinary shareholders and ADS holders to elect to receive new fully paid shares or ADSs instead of a cash dividend. The programme was approved by shareholders at the 2010 Annual General Meeting and this approval was renewed at both the 2015 and the 2018 Annual General Meeting (Figure 29).

BP is recognized in the market for managing a strong and diversified business portfolio that includes Upstream, Downstream, Renewable Energy and an established trading function. Its diversification strategy is supported by its global presence in more than 70 countries. In addition, BP has a unique partnership with Rosneft, the largest oil company in Russia (19.75% shareholding). This allows BP to remain resilient in a changing world, having the flexibility to adapt to changing trends and legislation, and helps BP to mitigate the impact of commodity pricing cycles.

Valuation Methods. To obtain BP's target price we used the Discounted Cash Flow (DCF) model through Free Cash Flow to the Firm (FCFF) methodology. Regarding that, we have made two distinct valuation methods:

i) BP as a whole - We derive the Enterprise Value of all BP segments, considering the existing synergies between segments, obtaining a price target of GBP 5.985/sh (Table 7);

ii) Sum of Parts (SoP) approach – We derive the Enterprise Value of each segment (Upstream, Downstream and Other Businesses and Corporate), considering the risk associated with each segment individually, obtaining a price target of GBP 5.480/sh (Table 9).

For both methods, we have subtracted gross debt and non-controlling interests from the determined Enterprise Value and made the necessary adjustments to equity to account for items previously not considered. However, since BP is an integrated oil and gas company, it makes sense to recognize the joint synergies of each segment, rejecting the SoP approach recommendation option.

As complementary methods we used DCF model through Free Cash Flow to the Equity (FCFE) methodology, obtaining a price target of GBP 6.139/sh. With the Dividend Discount Model (DDM) valuation, we have reached at a GBP 6.075/sh, and with the Multiples Valuation through EV / EBIT, Price-to-Earnings and Price-to-Book, obtaining an average price target of GBP 5.513/sh, that are in line with base 2020YE recommendation.

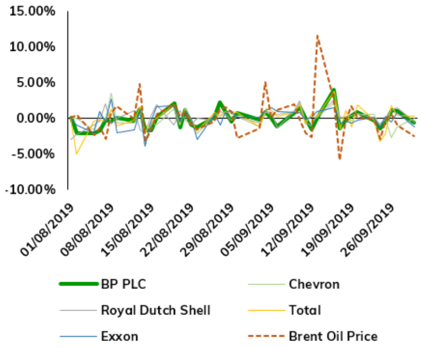
Risks to Achieve Price Target. In the Oil & Gas Refining industry, the nature of BP's business is inherent in greater risk exposure. As such, we must pay attention to some Investment Risks that cannot be controlled, but mitigated, by BP management. These risks include economic, environmental, operational and political risks.

Table 9: DCF Price Target - SoP

SUM OF PARTS (SoP)	g	%	USD
EV - UPSTREAM	0.95%	61%	109,877
EV - DOWSTREAM	1.36%	55%	99,970
EV - OTHER	0.83%	-16%	-28,717
(+) Enterprise Value		100%	181,130
(+) Non-operating assets			46,757
(-) Non-operating liabilities			51,585
(+) Cash and cash equivalents			22,523
(-) Debt (Gross Debt)			70,579
(-) Non-controlling interests			1,552
(=) Equity Value			126,693
Number of shares outstanding			20,102,443,000
Price target YE (US$)			6.30
Price target YE (GBP)			5.480

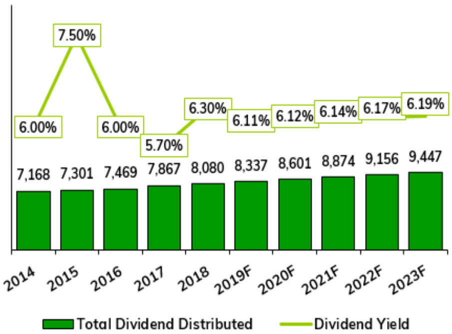
Source: *Author's estimates*

Figure 28: Brent Oil Price evolution vs Peers performance



Source: *Bloomberg data and Author's estimates*

Figure 29: BP's Dividends & Dividend Yield



Source: *Company data and Author's estimates*

Investors should be aware of the impact that exposure to commodity price volatility has on BP's operating results and future prospects. In addition, the impact that Brexit uncertainty may have on BP's foreign exchange exposure must be considered. The transition to a low carbon economy is another major challenge facing BP. Changes in laws and regulations may affect BP's way of operating, requiring it to adapt rapidly to new energy exploration and production methodologies.
Regarding with that, we have computed several sensitivity analysis to access the impact of changing variables on DCF valuation. For further details, please refer to the Investment Risk section.

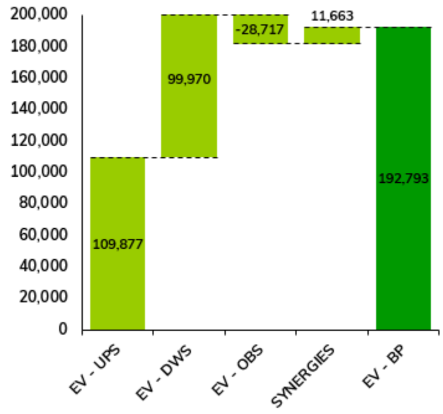
6. Valuation

BP as a whole: Free Cash Flow to the Firm. BP's core business is valued using a DCF model through FCFF methodology to determine the Enterprise Value of all BP segments (Upstream, Downstream and Other Businesses and Corporate), considering the existing synergies between segments (Figure 30). Regarding with that, we have adjusted it for gross debt and non-controlling interests and other items in order to arrive at a final Equity Value, estimating a price target of GBP 5.985 per common share for 2020YE.
Nevertheless, the DCF model through FCFF methodology was also tested using the SoP approach, considering the risk associated with each BP segment individually. However, taking into account the integrated oil and gas company profile, which its segments are interconnected generating synergies among themselves, it does not allow us to accept the SoP approach as a final recommendation option, as it does not reflect the real intrinsic value of the company (Figure 30).
Complementary approaches for the entire company using FCFE methodology, the DDM, and a multiples approach support the upside recommendation (Tables 10 and 11).

Upstream segment Assumptions. UPS includes three product typologies (Liquids; Natural gas; and, Hydrocarbons). To obtain the revenues, the "Realization x Production" calculation methodology was applied to all products. Thus, the historical correlation of the realization applied to each product against the market price variations over the years was estimated.
In the case of Liquids and Hydrocarbons, the correlation was made against the average Brent – Oil price, obtaining a historical correlation of 99%, allowing to estimate the future realization against the expected price fluctuations. For Natural gas, the same rational was applied, but compared to the average Henry Hub – Gas price, obtaining a correlation of around 90%.
Regarding the estimated production, the objectives and investment that BP has been reporting was used as an assumption. Thus, by 2021 production levels are projected to grow by 2.27% CAGR 2018YE-21F and to achieve the expected stable industry growth of about 0.41% YoY in the perpetuity.

Downstream segment Assumptions. DWS includes three business types (Sale of crude oil through spot and term contracts; Marketing, sport and term sales of refined products; and, Other sales and operating revenues). The second is responsible for about 75% of total segment revenues.
To estimate revenues from "Sale of crude oil through spot and term contracts" (represents about 22% of total segment revenues), the historical behaviour of the average Brent – Oil price variation was considered. In this way, it was possible to reach a correlation of about 98% that allowed to estimate future revenues in function of the log returns that the expected market price will generate.
To estimate revenues from "Marketing, sport and term sales of refined products", the calculation methodology "Total oil sales x BP Retail sites x Average selling price by Retail site" was applied. In this way, the objectives and investment that BP has been reporting was used as an assumption, with the mission of expanding its retail sites network to new markets (Indonesia and China), with an estimated growth of 0.50% CAGR 2018YE-23F. To calculate the average selling price, once again, the historical correlation was calculated against the variation of the average Brent – Oil price, obtaining a correlation of around 99%.
To estimate revenues from "Other sales and operating revenues" (represents about 3% of total segment revenues), the calculation methodology "Petrochemicals production x Average selling price" was applied. Thus, to obtain the Petrochemicals production the historical performance of the last 6 years was considered, with an estimated decrease of -3,19% YoY, result of its carbon footprint. For the average selling price, it was calculated based on the

Figure 30: BP's Enterprise Value (2020F)



Source: *Author's estimates*

Table 10: DCF Price Target - FCFE

DCF - FCFE	g	USD
(+) Enterprise Value	1.25%	143,474
(-) Non-controlling interests		1,552
(=) Equity Value		141,922
Number of shares outstanding		20,102,443,000
Price target YE (US$)		7.06
Price target YE (GBP)		6.139

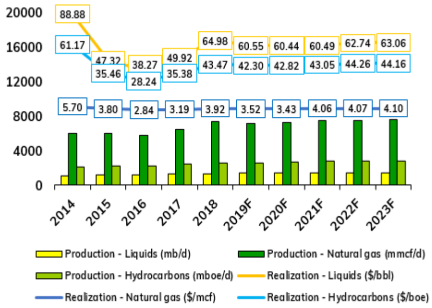
Source: *Author's estimates*

Table 11: DDM Price Target

DDM	g_s	g_l	USD
Total Dividend Distributed	3.54%	1.25%	8,601
(=) Equity Value			140,440
Number of shares outstanding			20,102,443,000
Price target YE (US$)			6.99
Price target YE (GBP)			6.075

Source: *Author's estimates*

Figure 31: Production & Realization by source



Source: *Company data and Author's estimates*

historical correlation of the average Henry Hub – Gas price, obtaining a correlation of around 80%.

Other Businesses and Corporate segment Assumptions. OBC comprise Alternative Energy business, in which BP is making a major investment considering the global energy transition. BP estimates in its BP Energy Outlook a 2040 projection that results in a 4% to 29% change in the global consumption of Renewables. This scenario is consistent with the Paris goals, and is broadly similar to the reduction in carbon emissions in the IEA's Sustainable Development Scenario.
That said, the segment is expected to grow 19.17% YoY, reaching about 1.35% of BP's total revenues by 2023.

CAPEX and D&A. BP forecasts capital expenditures to be in the range of $15 - $17 billion per year between 2018YE and 2021F, given the large investment it has been developing in its business portfolio. As a result, BP's CAPEX is expected to grow by about 5.07% YoY.
To estimate BP's D&A, BP expect the full-year charge to be around $2.5 billion higher than that reported in 2018. In the remaining period, it was assumed to calculate D&A as a function of CAPEX based on the historical weight of the last 6 years (Figure 32).

FCFE and DDM methods. The use of these complementary approaches is useful in valuing company, helping to sustain the investment recommendation. In the case of FCFE methodology, this is supported by the stable capital structure that the company presents, and it is expected to remain stable over time. The use of the DDM model is justified by the stable and progressive dividend policy that BP presents, making its share very attractive to its shareholders, as it always pays dividends even when it has a negative EPS.

WACC Assumptions. To discount the FCFF, the Weighted Average Cost of Capital (WACC) method was used (Table 8). Applying the Capital Asset Pricing Model (CAPM), we assume a Cost of Equity of 9.55% to forecast period. To estimate the Risk-Free Rate (RFR), we used the average of the last 5 years of 10-Year UK Government Bonds, with a constant value of 1.32%; For Market Risk Premium (MRP), we have used two distinct methods, getting an average value of 6.08%:

A) Aswath Damodaran's calculations as of January 2019, based on CDS spread, with a value of 5.96%;

B) Fernandez Survey (2019), with a value of 6.20%.

The Beta is around 1.29, which was derived using a pure-play method, in which we computed unlevered Beta and adjusting for BP's capital structure and tax rate. That value was supported by regressing BP's returns against the MSCI ACWI index returns. Country Risk Premium (CRP) was added to the model, with a value of 0.38%, according to Aswath Damodaran's calculations as of January 2019, based on CDS spread.

Cost of Debt. To determine BP's cost of Debt, the Credit spread method was used. To do this, we have used the same RFR to get Cost of Equity, adding two distinct headings: Default Spread Company and Default Spread Country. In relation to the Default Spread Company, we have used the Synthetic Rating Method, through the average calculation of the Interest Coverage Ratio, based on Aswath Damodaran's calculations as in January 2019, reaching a value of 1.56%. Finally, to get the Default Spread Country, Adj. Default Spread of United Kingdom was used, based on Aswath Damodaran's calculations as of January 2019, with a value of 0.69%
Thus, we assume a Cost of Debt of 3.57% to forecast period.

To summarize, given a relatively stable market capital structure around 38% D / EV, WACC will range from 6.85% in 2019F to 6.73% in Terminal Value.

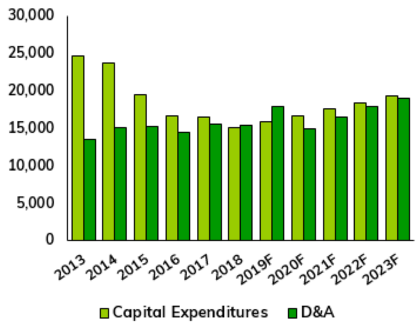
Peer's Selection. To select BP's peer companies, a two-stage process was conducted (Table 12):

(i) Preliminary selection of companies that are in the same industry according to Bloomberg's GICS (Sector - Energy; Industry - Oil, Gas & Coal; and, Sub-Industry - Integrated Oils);

(ii) Bloomberg Integral Oil Companies (IOC Group). Five largest IOC group by Market Cap and by Production level.

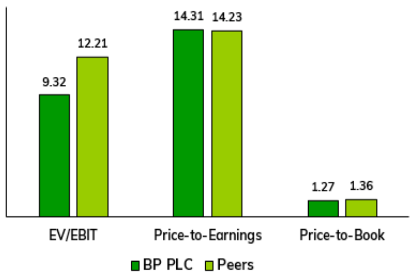
The Sum of Absolute Rank Differences (SARD) calculus approach, developed by Knudsen et al. (2017), was tested as a basis for determining the appropriate peer group. However, it did not produce the best proxy considering the differences in business compared to BP.

Figure 32: BP Capital Expenditures



Source: Company data and Author's estimates

Figure 33: BP PLC vs Peers' Multiples



Source: *Author's analysis*

Table 12: Peers' Group

Peers	SARD	Final
TOTAL SA	✓	✓
ROYAL DUTCH SH-A	✓	✓
PETROCHINA-H	✓	×
CHEVRON CORP	✓	✓
EXXON MOBIL CORP	✓	✓
ENI SPA	✓	×
GALP ENERGIA	✓	×
EQUINOR ASA	✓	×
PTT PCL	✓	×
MOL	✓	×

Source: *Author's analysis*

Table 13: Peers' Group Highlights

Peers	EBIT MARGIN	Mkt Cap (GBP)
TOTAL SA	8.90%	111,308,607,984
ROYAL DUTCH SH-A	7.76%	184,111,264,070
CHEVRON CORP	9.29%	186,659,648,555
EXXON MOBIL CORP	6.62%	246,623,208,357
BP PLC	5.01%	103,323,346,020

Source: *Bloomberg data*

Relative Valuation. Relative Valuation is used as a complementary approach to investment recommendation. In order to mitigate the differences in capital structure from peer's EV / EBIT was used, obtaining a price of GBP 5.710/sh. Price-to Earnings and Price-to-Book multiples were also used, based on similar peer's performance, generating values of GBP 4.997/sh and GBP 5.834/sh, respectively.
EV / EBIT and Price-to-book support the upside potential (+10.38% and +12.17%, respectively), while Price-to-Earnings points to a potential downside (-0.08%). However, we consider that Price-to-Earnings could be the most biased of these multiples, given each company's home country and differences in capital structure.

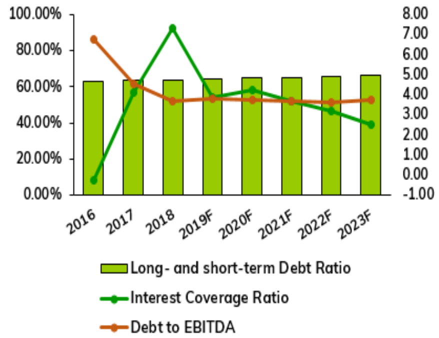
Figure 34: EBIT Margin and ROACE

Source: *Company data and Author's estimates*

7. Financial Analysis

Prospects for improving Operational Efficiency. Historically, since 2016, there has been a recovery in commodity prices. As a result, BP has recorded an increase in its sales over the period 2016YE-18YE of 27.77% CAGR, rising from $ 183,008 to $ 298,756. However, the uncertainty associated with the economic reality and its evolution in commodity prices is expected to decline to 1.73% CAGR, allowing BP to reach $ 325,586 in its sales by 2023F.
Regarding with that, BP has a positive outlook for improving its operating efficiency, with its EBIT Margin increasing from -0.23% to 6.49% between 2016YE-18YE and reaching 4.78% in 2023F (Figure 34).
Based on its business strategy, BP in its management report expects to achieve a ROACE above 10% in 2021F, meaning a considerable increase in the profitability of its investments. Thus, BP is expected to achieve a ROACE of around 11.62% in 2023F (a considerable increase of 9p.p. compared to 2016, which was 2.80%).

Figure 35: Interest Coverage Ratio and Capital Structure



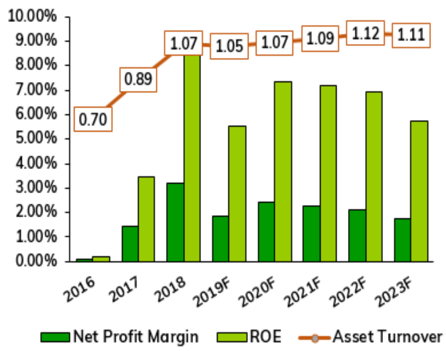
Source: *Company data and Author's estimates*

Stable Capital Structure and recovery in Solvency Capacity. Given high performance expected to be achieved, BP is improving its solvency ratios by increasing its ability to generate debt repayments. Thus, the Interest Coverage Ratio increased from -0.23x to 7.30x in the 2016YE-18YE period, expecting to reach 2.52x in 2023F. By the same token, the Debt to EBITDA ratio is decreasing from 6.76x to 3.66x in the 2016YE-18YE period, expecting to reach 3.73x in 2023F.
BP's capital structure is expected to remain relatively stable, considering the divestments that BP makes as a result of new investments. Thus, the Long- and short-term Debt ratio is expected to remain stable at around 66% in 2023F and is in line with historical figures at 64%. Similarly, the Equity Multiplier is expected to remain around 2.9x over the forecast period (Figure 35).

Improving profitability levels – DuPont Analysis. Looking at profitability ratios, BP is expected to show a steady improvement. Net Profit Margin is improving from 0.09% in 2016YE to 3.21% in 2018YE, expecting to reach 1.73% in 2023F. Given the projected increase in revenues, there is an increase in Asset Turnover, from 0.70x to 1.07x in the 2016YE-18YE period, reaching a value of 1.11x in 2023F. To the same extent, as noted, a constant Equity Multiplier is expected.
As a result, DuPont Analysis expects ROE to grow from 0.18% in 2016YE to 9.43% in 2018YE and reaching 5.75% in 2023F (Figure 36).

Solid Cash Generation. FCFF will range between $6,466M and $10,349M from 2019F-23F, with an earnings quality consistently above 1. This give a strong generation of operational cash flow to cover investment activities.
BP has a Cash Ratio ranging from 0.76x to 0.69x between 2016YE-18YE, increasing to 0.80x in 2023F, and a Quick Ratio that follows the same behaviour, reaching 0.82x in 2023F.
The forecasted cash surplus of $31,850M in 2023F will allow the company to keep the investment strategy in the Energy Transition as well as in maintaining the shareholder return policy (Figure 37).

Figure 36: DuPont Analysis



Source: *Company data and Author's estimates*

8. Investment Risks

Economic and Market Risk | World GDP Growth (EMR1)
One of the key drivers of the Oil & Gas Industry is Energy demand. This is strongly influenced by the global economic conditions. Considering the moment of uncertainty in the world economy, influenced by the confrontation between the major powers and political developments, it could affect the Energy demand and supply.
Thus, as the industry is sensitive to global GDP growth, an economic downturn may affect negatively BP's results and future prospects (Figure 39).
To respond to this risk, BP benefits from a diversified portfolio that allows it to be present on many businesses, providing a positive response to market uncertainty.

Economic and Market Risk | Commodities Price (EMR2)
BP performance is high impacted by fluctuating prices of oil, gas and refined products. These are affected by political developments, global economic conditions and the influence of OPEC, constraining the international supply and demand. Oil & Gas Industry are trading with increasing volatilities, creating a constant uncertainty about the price charged.
Thus, decreases in commodities price could have an adverse effect on revenue, margins and profitability.

Economic and Market Risk | Exchange Rate Fluctuations (EMR3)
BP is present in over 70 countries, creating currency exposures and impact underlying costs and revenues. Many of the costs related to major projects developed by BP are recognized in local currencies, which may be subject to fluctuations against the US dollar (Figure 40).
BP has made an effort to mitigate these risks through BP's diversified portfolio, BP's financial framework, developing liquidity stress tests, maintaining a significant cash buffer, regular reviews of market conditions and BP's planning and investment processes.

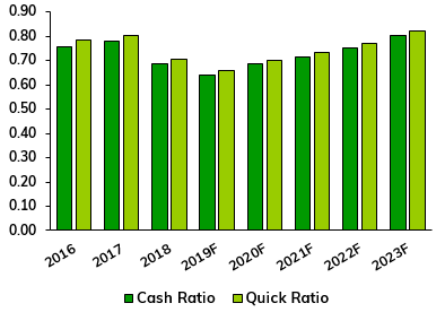
Economic and Market Risk | Access, renewal and reserves progression (EMR4)
The Oil & Gas industry is marked by limited resources, which causes huge competition among its players in search of new investment opportunities. BP's strategic progress may be affected by capital commitments and political and economic risks in the countries where significant hydrocarbons basins are located.
In order to mitigate this risk, BP has been trying to improve its ability to progress upstream resources and sustain long-term reserves replacement.

Political and Regulatory Risk | Geopolitical Risk (PRR1)
BP operates in many regions. Political instability, changes to the regulatory environment or taxation, international sanction, expropriation or nationalization of property, acts of terrorism and acts of war may disrupt BP's operations or development activities.
BP is exposed to the impact and uncertainty of the UK's exit from the EU (Brexit). BP has been preparing different scenarios, but they believe that the impact will be reduced on their core business.
BP seeks to manage these risks through development and maintenance of relationships with governments and stakeholders and by becoming trusted partners in each country and region.

Political and Regulatory Risk | Regulation and subject Penalties (PRR2)
The nature of BP's business requires it to be subject to increasingly stringent laws and regulations. Changes in the fiscal and regulatory frameworks by Governments, as well as, legislative environment could increase the cost of compliance, affect provisions and limit BP access to new growth opportunities (e.g. Gulf of Mexico oil spill penalties).
In order to mitigate this risk, BP is pursuing divestment or reduction strategies for certain assets, as well as curtail or cease certain operations.

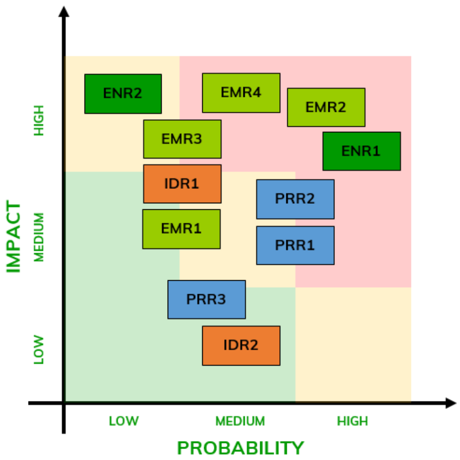
Political and Regulatory Risk | Reputational Risk (PRR3)
BP in the recent past has suffered drastically in its sustainability rating, especially associated with Gulf of Mexico oil spill. Incidents of ethical misconduct or breaches of applicable laws by BP's businesses or employees could be damaging to their reputation, and could result in litigation, regulatory action and penalties.
Regarding with this risk, BP has a strong code of conduct and values and behaviours, that are applied to all employees. BP offers an independent confidential helpline, OpenTalk, for employees, contractors and other third parties.

Figure 37: Cash Ratio and Quick Ratio



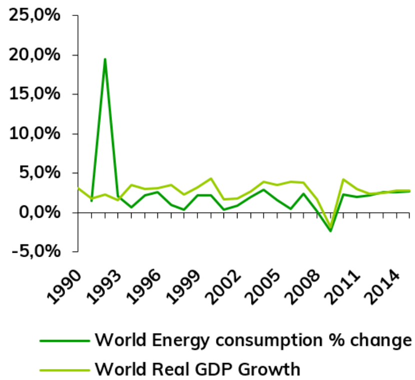
Source: *Company data and Author's estimates*

Figure 38: Risk Matrix



Source: Author's estimates

Figure 39: World Energy Consumption vs World Real GDP growth



Source: *Economist Intelligence Unit*

Industry Risk | **Security and External threats (IDR1)**
BP's activity involves a set of operational risks associated with external threats. Hostile acts such as terrorism or piracy could harm BP's people and disrupt their operations. BP monitors for emerging threats and vulnerabilities to manage their physical and information security.
BP seeks to manage this risk through its central security team that provides guidance and support to BP's businesses through a network of regional security advisers who advise and conduct assurance activities.

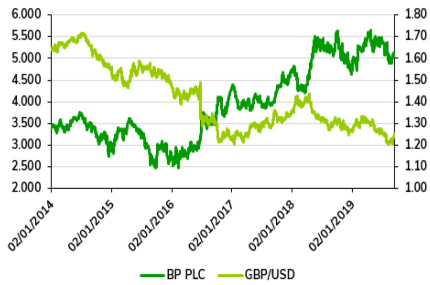
Figure 40: GBP / USD quote

Source: *Bloomberg data*

Industry Risk | **Cyber security (IDR2)**
The Oil & Gas industry is subject to fast-evolving risks from cyber threat actors, including nations states, criminals, terrorists, hacktivists and insiders. These could result in significant costs and reputational consequences.
In order to mitigate this risk, BP is implementing a range of measures, which include cyber security standards and security protection tools. Also, BP collaborates closely with governments, law enforcement agencies and industry peers to understand and respond to new and emerging cyber threats.

Environmental Risk | **Transition to a lower carbon economy (ENR1)**
There has been a recent energy transition to a low carbon world. As such, changes in laws, regulations, policies, obligations, social attitudes and customer preferences could have a cost impact on BP's business, including increasing compliance and litigation costs (e.g. Paris climate agreement).
BP has made an effort to mitigate this risk through BP's strong investment it has been developing in renewable energy exploration and production as well as global strategic partnerships it has developed.

Figure 41: BP PLC vs GBP / USD quote



Source: *Bloomberg data*

Environmental Risk | **Natural disaster (ENR2)**
The nature of BP's operating activities exposes them to a wide range of significant health, safety and environmental risks such as incidents associated with releases of hydrocarbons when drilling wells, operating facilities and transporting hydrocarbons.
Regarding with this risk, BP conducts the drilling activity through a global wells organization in order to promote a consistent approach for designing, constructing and managing wells.

Risks to Price Target. In order to compute the impact of several investment risks on BP's price target, we have conducted a sensitivity analysis and a Monte Carlo simulation. Our focus was on studying the impact of key variables that impact both BP performance and the valuation model.

Figure 42: Recommendation System

Level of Risk	High Risk	
	From	To
SELL	-	5.002
REDUCE	5.002	5.683
HOLD/NEUTRAL	5.683	6.386
BUY	6.386	8.229
STRONG BUY	8.229	∞

Source: *Author's estimates*

Regarding the sensitivity analysis, we have computed 3 distinct tests. The first allowed us to understand the impact on the target price, by changing the Average Brent – Oil price (with a change of 5.00 USD) against GBP/USD – Forecast for 2020 (with a change of 0.1). Thus, we can conclude that BP's performance is very sensitive to these two variables, causing an extreme change in the price target recommendation.

Table 14: Sensitivity analysis for the Average Brent vs GBP/USD

GBP/USD - Forecast (variation of 0.1)	Average Brent - Oil price (variation of 5.00 USD)							
	5.985	52.00	57.00	62.00	67.00	72.00	77.00	82.00
	0.85	7.805	7.903	8.000	8.097	8.194	8.292	8.389
	0.95	6.984	7.071	7.158	7.245	7.332	7.419	7.506
	1.05	6.319	6.397	6.476	6.555	6.634	6.712	6.791
	1.15	5.769	5.841	5.913	5.985	6.057	6.129	6.201
	1.25	5.308	5.374	5.440	5.506	5.572	5.638	5.704
	1.35	4.914	4.976	5.037	5.098	5.159	5.221	5.282
	1.45	4.576	4.633	4.690	4.747	4.804	4.861	4.918

The second test analysed the impact of key components of the DCF valuation model. Thus, the Risk-free rate (with a 0.60 pp variation) was measured against the 0.1 pp variation in the Country Risk Premium. This made it possible to understand that BP does not feel a major impact on its performance with a possible increase in country risk, strongly justified by its worldwide presence.

Table 15: Sensitivity analysis for the Risk-free rate vs Country Risk Premium

Country Risk Premium (CRP) (variation of 0.1 pp)	Risk-free rate (Rf) (variation of 0.60 pp)							
	5.985	-0.48%	0.12%	0.72%	1.32%	1.92%	2.52%	3.12%
	0.08%	6.360	6.246	6.134	6.025	5.917	5.812	5.709
	0.18%	6.346	6.232	6.121	6.011	5.904	5.799	5.696
	0.28%	6.332	6.218	6.107	5.998	5.891	5.787	5.684
	0.38%	6.317	6.204	6.093	5.985	5.878	5.774	5.672
	0.48%	6.303	6.191	6.080	5.972	5.865	5.761	5.659
	0.58%	6.289	6.177	6.067	5.959	5.853	5.749	5.647
	0.68%	6.275	6.163	6.053	5.945	5.840	5.736	5.635

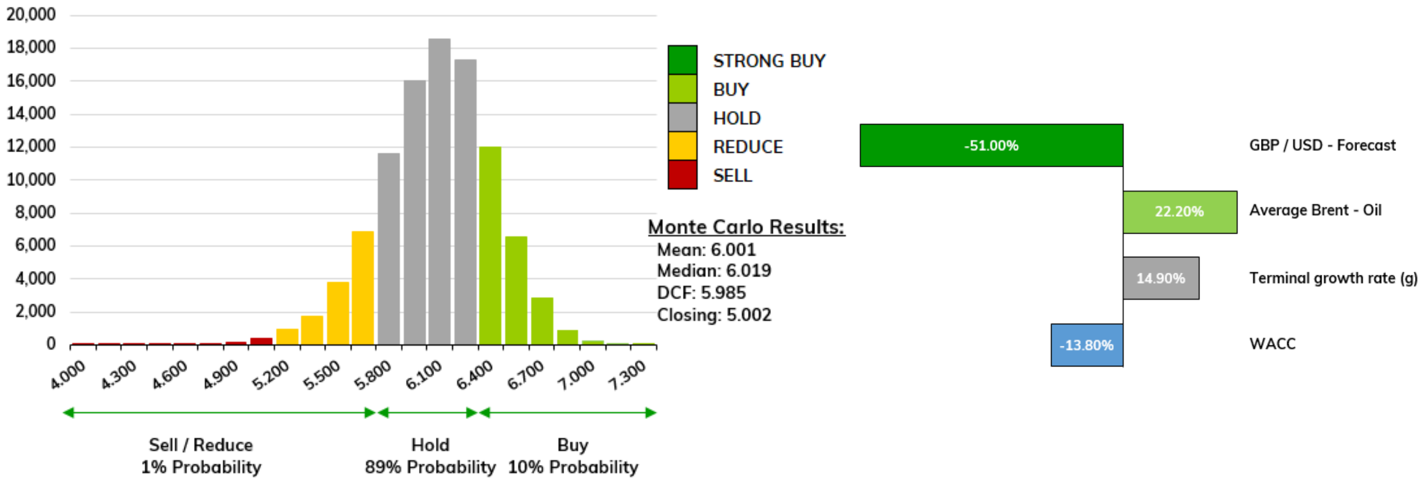
Finally, the two main variables of the DCF valuation model were compared. Thus, the impact on BP price target was studied by varying the Terminal growth rate (with a variation of 0.15 pp) against the WACC, with a variation of 0.5 pp. As expected, it was the test that had the greatest impact on the final investment recommendation. We conclude that BP's price is highly sensitive to changes in its terminal value, causing the worst-case scenario to fall to GBP 4.263 (-11.25%).

Table 16: Sensitivity analysis for the Terminal growth rate vs WACC

WACC (variation of 0.5 pp)	Terminal growth rate (g) (variation of 0.15 pp)							
	5.985	0.80%	0.95%	1.10%	1.25%	1.40%	1.55%	1.70%
	5.23%	7.487	7.780	8.094	8.431	8.795	9.189	9.616
	5.73%	6.677	6.913	7.165	7.433	7.721	8.028	8.359
	6.23%	6.015	6.211	6.417	6.636	6.869	7.116	7.381
	6.73%	5.466	5.630	5.803	5.985	6.177	6.381	6.597
	7.23%	5.002	5.142	5.289	5.443	5.605	5.775	5.955
	7.73%	4.606	4.726	4.852	4.984	5.122	5.267	5.420
	8.23%	4.263	4.368	4.477	4.592	4.711	4.836	4.966

As a way to complement the previous sensitivity analysis, Monte Carlo simulation was considered using the Crystal Ball Software, covering a total of 100,000 trials. BP's valuation is highly sensitive to GBP/USD exchange rate, Average Brent – Oil price and Terminal growth rate. The results show a mean price of GBP 6.001, which is similar to our DCF price target of GBP 5.985. Our HOLD recommendation has an 89% probability of being accurate.

Figure 43: Monte Carlo simulation results



Variable	Mean	Std. Dev.	Distribution	Assumption
Average Brent - Oil price	67.00	10.00	Normal Distribution	Stress the target price sensitivity to changes in the Average Brent - Oil price.
GBP/USD - Forecast	1.15	0.05	Lognormal Distribution	Stress the target price sensitivity to changes in the GBP/USD - Forecast.
Terminal growth rate (g)	1.25%	0.10%	Normal Distribution	Stress the target price sensitivity to changes in the Terminal growth rate (g).
WACC	6.73%	0.10%	Normal Distribution	Stress the target price sensitivity to changes in the WACC.

Monte Carlo's Statistics	
Nº of trials	100,000
Base Case	5.985
Mean	6.001
Standard Deviation	0.33
10th Percentie	5.574
90th Percentile	6.409
Upside potential	14.56%

Recommendation	HOLD

Source: *Author's estimates*

Appendices

Appendix 1: Statement of Financial Position (BP PLC)

GROUP BALANCE SHEET	2016	2017	2018	2019F	2020F	2021F	2022F	2023F	CAGR 2018/2023F
Non-current assets	**195,503**	**201,547**	**210,866**	**210,770**	**209,331**	**207,348**	**205,038**	**202,521**	-0.80%
Fixed assets	182,868	185,607	192,410	192,314	190,875	188,892	186,582	184,065	-0.88%
Property, plant and equipment	129,757	129,471	135,261	135,734	133,754	131,294	128,451	125,428	-1.50%
Goodwill	11,194	11,551	12,204	12,204	12,204	12,204	12,204	12,204	0.00%
Intangible assets	18,183	18,355	17,284	16,712	17,195	17,563	17,947	18,301	1.15%
Investments in joint ventures	8,609	7,994	8,647	8,541	8,436	8,332	8,229	8,128	-1.23%
Investments in associates	14,092	16,991	17,673	17,888	18,106	18,326	18,549	18,775	1.22%
Rosneft	8,243	10,059	10,074	11,590	11,205	11,084	11,187	11,380	2.47%
Other associates	5,849	6,932	7,599	6,298	6,901	7,242	7,362	7,395	-0.54%
Other investments	1,033	1,245	1,341	1,236	1,181	1,173	1,201	1,229	-1.72%
Loans	532	646	637	637	637	637	637	637	0.00%
Trade and other receivables	1,474	1,434	1,834	1,834	1,834	1,834	1,834	1,834	0.00%
Derivative financial instruments	4,359	4,110	5,145	5,145	5,145	5,145	5,145	5,145	0.00%
Prepayments	945	1,112	1,179	1,179	1,179	1,179	1,179	1,179	0.00%
Deferred tax assets	4,741	4,469	3,706	3,706	3,706	3,706	3,706	3,706	0.00%
Defined benefit pension plan surpluses	584	4,169	5,955	5,955	5,955	5,955	5,955	5,955	0.00%
Current assets	**67,813**	**74,968**	**71,310**	**72,330**	**76,996**	**82,142**	**87,600**	**91,779**	5.18%
Loans	259	190	326	326	326	326	326	326	0.00%
Inventories	17,655	19,011	17,988	21,279	21,466	23,109	24,458	23,328	5.34%
Trade and other receivables	20,675	24,849	24,478	25,242	26,029	26,841	27,678	28,542	3.12%
Derivative financial instruments	3,016	3,032	3,846	4,136	4,447	4,782	5,142	5,530	7.53%
Prepayments	1,486	1,414	963	963	963	963	963	963	0.00%
Current tax receivable	1,194	761	1,019	1,019	1,019	1,019	1,019	1,019	0.00%
Other investments	44	125	222	222	222	222	222	222	0.00%
Cash and cash equivalents	23,484	25,586	22,468	19,144	22,523	24,880	27,791	31,850	7.23%
Assets classified as held for sale	-	-	-	-	-	-	-	-	n.a.
Total assets	**263,316**	**276,515**	**282,176**	**283,101**	**286,327**	**289,490**	**292,637**	**294,300**	**0.84%**
Non-current liabilities	**108,119**	**111,385**	**112,391**	**113,666**	**115,184**	**116,943**	**118,944**	**121,187**	1.52%
Other payables	13,946	13,889	13,830	13,830	13,830	13,830	13,830	13,830	0.00%
Derivative financial instruments	5,513	3,761	5,625	5,625	5,625	5,625	5,625	5,625	0.00%
Accruals	469	505	575	575	575	575	575	575	0.00%
Finance debt	51,666	55,491	56,426	58,315	60,266	62,284	64,368	66,523	3.35%
Deferred tax liabilities	7,238	7,982	9,812	10,618	11,490	12,434	13,456	14,562	8.22%
Provisions	20,412	20,620	17,732	16,312	15,006	13,804	12,699	11,682	-8.01%
Defined benefit pension plan and other post-retirement benefit plan deficits	8,875	9,137	8,391	8,391	8,391	8,391	8,391	8,391	0.00%
Current liabilities	**58,354**	**64,726**	**68,237**	**69,535**	**70,871**	**72,246**	**73,661**	**75,118**	1.94%
Trade and other payables	37,915	44,209	46,265	47,104	47,959	48,829	49,715	50,617	1.81%
Derivative financial instruments	2,991	2,808	3,308	3,308	3,308	3,308	3,308	3,308	0.00%
Accruals	5,136	4,960	4,626	4,626	4,626	4,626	4,626	4,626	0.00%
Finance debt	6,634	7,739	9,373	9,832	10,313	10,818	11,347	11,903	4.89%
Current tax payable	1,666	1,686	2,101	2,101	2,101	2,101	2,101	2,101	0.00%
Provisions	4,012	3,324	2,564	2,564	2,564	2,564	2,564	2,564	0.00%
Liabilities directly associated with assets classified as held for sale	-	-	-	-	-	-	-	-	n.a.
Total liabilities	**166,473**	**176,111**	**180,628**	**183,201**	**186,055**	**189,189**	**192,605**	**196,306**	**1.68%**
Share Capital	15,283	17,503	17,490	17,135	17,135	17,135	17,135	17,135	-0.41%
Treasury Shares	(19,964)	(18,443)	(16,958)	(16,958)	(16,958)	(16,958)	(16,958)	(16,958)	0.00%
Capital Reserves	103,068	97,783	99,872	102,581	101,288	101,660	101,689	101,420	0.31%
Profit (loss) for the year	172	3,468	9,578	5,535	7,365	7,186	6,934	5,638	-10.06%
Other comprehensive income	(988)	5,016	(1,980)	(1,980)	(1,980)	(1,980)	(1,980)	(1,980)	0.00%
Dividends	(4,718)	(6,294)	(6,869)	(6,828)	(6,992)	(7,158)	(7,202)	(7,676)	2.25%
Cash flow hedges transferred to the balance sheet, net of tax	-	-	26	26	26	26	26	26	0.00%
Repurchase of ordinary share capital	-	(343)	(355)	(355)	(355)	(355)	(355)	(355)	0.00%
Share-based payments, net of tax	2,991	687	703	703	703	703	703	703	0.00%
Share of equity-accounted entities' changes in equity, net of tax	106	215	14	14	14	14	14	14	0.00%
Transactions involving non-controlling interests, net of tax	893	812	207	207	207	207	207	207	0.00%
Adjustment on adoption of IFRS 9, net of tax	-	-	(180)	(180)	(180)	(180)	(180)	(180)	0.00%
Total equity	**96,843**	**100,404**	**101,548**	**99,900**	**100,272**	**100,301**	**100,032**	**97,994**	**-0.71%**
BP shareholders' equity	95,286	98,491	99,444	98,453	98,720	98,667	98,330	96,312	-0.64%
Non-controlling interests	1,557	1,913	2,104	1,447	1,552	1,633	1,702	1,683	-4.37%
Total equity and liabilities	**263,316**	**276,515**	**282,176**	**283,101**	**286,327**	**289,490**	**292,637**	**294,300**	**0.84%**
	0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	
Balance Sheet Validation	✓	✓	✓	✓	✓	✓	✓	✓	

Appendix 2: Income Statement (BP PLC)

GROUP INCOME STATEMENT	2016	2017	2018	2019F	2020F	2021F	2022F	2023F	CAGR 2018/2023F
Sales and other operating revenues	183,008	240,208	298,756	298,068	304,758	314,339	325,265	325,586	1.73%
Upstream	33,188	45,440	56,399	56,902	58,600	61,606	63,610	63,967	2.55%
Downstream	167,683	219,853	270,689	271,726	277,445	285,421	295,163	294,966	1.73%
Other businesses and corporate	1,667	1,469	1,678	2,000	2,383	2,840	3,384	4,033	19.17%
Upstream - sales and other operating revenues between segments	(17,581)	(24,179)	(28,565)	(30,704)	(31,620)	(33,242)	(34,323)	(34,516)	3.86%
Downstream - sales and other operating revenues between segments	(1,291)	(1,800)	(574)	(941)	(961)	(989)	(1,023)	(1,022)	12.23%
Other businesses and corporate - sales and other operating revenues between segments	(658)	(575)	(871)	(914)	(1,089)	(1,298)	(1,546)	(1,843)	16.17%
Earnings from joint ventures – after interest and tax	966	1,177	897	672	709	732	859	841	-1.28%
Earnings from associates – after interest and tax	994	1,330	2,856	2,094	1,986	1,850	1,852	1,994	-6.93%
Rosneft	647	922	2,283	1,557	1,473	1,369	1,375	1,496	-8.10%
Other associates	347	408	573	537	513	481	476	498	-2.77%
Interest and other income	506	657	773	695	681	654	661	687	-2.34%
Gains on sale of businesses and fixed assets	1,132	1,210	456	872	867	907	862	793	11.70%
Total revenues and other income	**186,606**	**244,582**	**303,738**	**302,400**	**309,000**	**318,482**	**329,499**	**329,901**	**1.67%**
Purchases	(132,219)	(179,716)	(229,878)	(227,676)	(232,786)	(240,104)	(249,528)	(249,774)	1.67%
Production and manufacturing expenses	(29,077)	(24,229)	(23,005)	(24,300)	(24,961)	(25,640)	(25,326)	(25,430)	2.02%
Production and similar taxes	(683)	(1,775)	(1,536)	(2,378)	(1,892)	(1,839)	(1,968)	(2,095)	6.41%
Earnings Before Interest, Taxes, Depreciation and Amortization - EBITDA	**24,627**	**38,862**	**49,319**	**48,047**	**49,362**	**50,899**	**52,676**	**52,601**	**1.30%**
Depreciation, depletion and amortization	(14,505)	(15,584)	(15,457)	(17,957)	(14,988)	(16,506)	(17,837)	(19,053)	4.27%
Upstream	(12,231)	(13,268)	(13,118)	(15,065)	(12,627)	(13,949)	(15,071)	(16,105)	4.19%
Downstream	(1,950)	(2,016)	(2,077)	(2,519)	(2,067)	(2,234)	(2,413)	(2,580)	4.44%
Other businesses and corporate	(324)	(300)	(262)	(373)	(295)	(322)	(352)	(368)	7.03%
Impairment and losses on sale of businesses and fixed assets	1,664	(1,216)	(860)	(2,208)	(2,249)	(1,130)	(1,000)	(1,444)	10.92%
Exploration expense	(1,721)	(2,080)	(1,445)	(2,445)	(2,279)	(2,054)	(2,004)	(2,051)	7.26%
Distribution and administration expenses	(10,495)	(10,508)	(12,179)	(12,998)	(13,815)	(14,807)	(15,065)	(14,482)	3.52%
Profit (loss) before interest and taxation - EBIT	**(430)**	**9,474**	**19,378**	**12,438**	**16,030**	**16,402**	**16,771**	**15,571**	**-4.28%**
Finance costs	(1,675)	(2,074)	(2,528)	(3,003)	(3,568)	(4,239)	(5,037)	(5,984)	18.81%
Net finance expense relating to pensions and other post-retirement benefits	(190)	(220)	(127)	(211)	(187)	(186)	(178)	(190)	8.44%
Profit (loss) before taxation - EBT	**(2,295)**	**7,180**	**16,723**	**9,224**	**12,275**	**11,977**	**11,556**	**9,397**	**-10.89%**
Taxation	2,467	(3,712)	(7,145)	(3,690)	(4,910)	(4,791)	(4,623)	(3,759)	-12.06%
Profit (loss) for the year	**172**	**3,468**	**9,578**	**5,535**	**7,365**	**7,186**	**6,934**	**5,638**	**-10.06%**
Attributable to									
BP shareholders	115	3,389	9,383	5,415	7,210	7,033	6,787	5,519	-10.07%
Non-controlling interests	57	79	195	119	154	153	146	119	-9.33%

Appendix 3: Cash Flow Statement (BP PLC)

GROUP CASH FLOW STATEMENT	2019F	2020F	2021F	2022F	2023F
Operating activities	**23,660**	**26,158**	**26,703**	**28,853**	**32,203**
+ EBIT	12,438	16,030	16,402	16,771	15,571
+ D&A	17,957	14,988	16,506	17,837	19,053
- Income Taxes paid	(3,690)	(4,910)	(4,791)	(4,623)	(3,759)
- Δ NWC	(3,046)	49	(1,415)	(1,131)	1,337
Investment Activities	**(17,861)**	**(13,549)**	**(14,523)**	**(15,526)**	**(16,537)**
- CAPEX	(15,908)	(16,714)	(17,560)	(18,450)	(19,384)
- Acquisitions, net of cash acquired	(5,250)	0	0	0	0
+/- Investment in joint ventures	106	105	104	102	101
+/- Investment in associates	(215)	(218)	(220)	(223)	(226)
+/- Other Investments	105	55	8	(28)	(28)
+ Divestments	3,300	3,222	3,146	3,072	3,000
Financing Activities	**(9,122)**	**(9,230)**	**(9,824)**	**(10,416)**	**(11,607)**
Net issue (repurchase) of shares	(355)	0	0	0	0
- Interes paid	(3,214)	(3,755)	(4,426)	(5,214)	(6,174)
- Dividends paid	(6,828)	(6,992)	(7,158)	(7,202)	(7,676)
Δ Debt	1,275	1,518	1,760	2,001	2,243
Increase (decrease) in cash and cash equivalents	(3,324)	3,379	2,357	2,911	4,059
Cash and cash equivalents at beginning of year	22,468	19,144	22,523	24,880	27,791
Cash and cash equivalents at end of year	**19,144**	**22,523**	**24,880**	**27,791**	**31,850**

Appendix 4: Key Financial Ratios

Key Financial Ratios	Units	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F
PROFITABILITY RATIOS										
EBITDA Margin	%	10.37%	13.46%	16.18%	16.51%	16.12%	16.20%	16.19%	16.19%	16.16%
EBIT Margin	%	-3.55%	-0.23%	3.94%	6.49%	4.17%	5.26%	5.22%	5.16%	4.78%
Net Profit Margin	%	-2.87%	0.09%	1.44%	3.21%	1.86%	2.42%	2.29%	2.13%	1.73%
ROA	%	-2.44%	0.07%	1.25%	3.39%	1.95%	2.57%	2.48%	2.37%	1.92%
ROE	%	-6.50%	0.18%	3.45%	9.43%	5.54%	7.34%	7.16%	6.93%	5.75%
ROACE	%	5.50%	2.80%	5.80%	11.20%	9.24%	11.75%	12.04%	12.33%	11.62%
EPS	times	-0.35	0.01	0.18	0.48	0.28	0.37	0.36	0.34	0.28
EFFICIENCY RATIOS										
Total Assets Turnover	times	0.82	0.70	0.89	1.07	1.05	1.07	1.09	1.12	1.11
Accounts Receivables Turnover	times	7.79	7.81	9.83	11.44	11.40	11.32	11.34	11.39	11.07
Collection Period (DSO)	days	46.22	45.82	36.47	31.38	31.56	31.80	31.77	31.62	32.53
Inventory Turnover	times	10.14	8.32	9.80	12.43	11.60	10.89	10.77	10.49	10.45
Days Inventory Outstanding (DIO)	days	36.01	43.89	37.23	29.37	31.48	33.51	33.88	34.79	34.92
Payables Turnover	times	3.76	3.34	3.93	4.57	4.50	4.47	4.56	4.65	4.54
Payables Period (DPO)	days	94.61	112.16	93.65	79.44	82.26	81.78	80.60	78.84	80.07
Operating Cycle	days	82.87	90.61	74.37	61.27	63.50	65.76	66.07	66.83	67.87
Cash Cycle Conversion (CCC)	days	-12.39	-22.45	-19.95	-18.69	-19.22	-16.47	-14.94	-12.43	-12.63
LIQUIDITY RATIOS										
Current Ratio	times	1.28	1.16	1.16	1.05	1.04	1.09	1.14	1.19	1.22
Quick Ratio	times	0.93	0.79	0.80	0.71	0.66	0.70	0.73	0.77	0.82
Cash Ratio	times	0.89	0.76	0.78	0.69	0.64	0.69	0.72	0.75	0.80
Interest Coverage Ratio	times	-4.79	-0.23	4.13	7.30	3.87	4.27	3.71	3.22	2.52
SOLVENCY RATIOS										
Long- and short-term Debt Ratio (%)	%	62.42%	63.22%	63.69%	64.01%	64.71%	64.98%	65.35%	65.82%	66.70%
Long-term Debt Ratio (%)	%	35.05%	30.12%	30.41%	29.76%	30.11%	30.30%	30.58%	30.93%	31.52%
Debt to Equity Ratio (x)	times	1.66	1.72	1.75	1.78	1.83	1.86	1.89	1.93	2.00
Equity Multiplier (x)	times	2.66	2.72	2.75	2.78	2.83	2.86	2.89	2.93	3.00
Debt to EBITDA	times	7.07	6.76	4.53	3.66	3.81	3.77	3.72	3.66	3.73
Net Debt Ratio	%	21.39%	26.44%	27.27%	29.91%	32.91%	32.40%	32.47%	32.39%	32.22%
PAYOUT RATIO AND DIVIDEND YIELD										
Payout Ratio	%	-104.13%	4102.61%	185.72%	73.21%	126.08%	96.98%	101.77%	106.11%	139.09%
Dividend Yield	%	7.50%	6.00%	5.70%	6.30%	6.11%	6.12%	6.14%	6.17%	6.19%
Shares Outstanding (m)		**18,323,646**	**18,855,319**	**19,816,442**	**20,102,493**	**20,102,443**	**20,102,443**	**20,102,443**	**20,102,443**	**20,102,443**

Appendix 5: Common-Size Statement of Financial Position (BP PLC)

COMMON-SIZE BALANCE SHEET (% of Total Assets)	2016	2017	2018	2019F	2020F	2021F	2022F	2023F
Non-current assets	**74.25%**	**72.89%**	**74.73%**	**74.45%**	**73.11%**	**71.63%**	**70.07%**	**68.81%**
Fixed assets	69.45%	67.12%	68.19%	67.93%	66.66%	65.25%	63.76%	62.54%
Property, plant and equipment	49.28%	46.82%	47.93%	47.95%	46.71%	45.35%	43.89%	42.62%
Goodwill	4.25%	4.18%	4.32%	4.31%	4.26%	4.22%	4.17%	4.15%
Intangible assets	6.91%	6.64%	6.13%	5.90%	6.01%	6.07%	6.13%	6.22%
Investments in joint ventures	3.27%	2.89%	3.06%	3.02%	2.95%	2.88%	2.81%	2.76%
Investments in associates	5.35%	6.14%	6.26%	6.32%	6.32%	6.33%	6.34%	6.38%
Rosneft	3.13%	3.64%	3.57%	4.09%	3.91%	3.83%	3.82%	3.87%
Other associates	2.22%	2.51%	2.69%	2.22%	2.41%	2.50%	2.52%	2.51%
Other investments	0.39%	0.45%	0.48%	0.44%	0.41%	0.41%	0.41%	0.42%
Loans	0.20%	0.23%	0.23%	0.23%	0.22%	0.22%	0.22%	0.22%
Trade and other receivables	0.56%	0.52%	0.65%	0.65%	0.64%	0.63%	0.63%	0.62%
Derivative financial instruments	1.66%	1.49%	1.82%	1.82%	1.80%	1.78%	1.76%	1.75%
Prepayments	0.36%	0.40%	0.42%	0.42%	0.41%	0.41%	0.40%	0.40%
Deferred tax assets	1.80%	1.62%	1.31%	1.31%	1.29%	1.28%	1.27%	1.26%
Defined benefit pension plan surpluses	0.22%	1.51%	2.11%	2.10%	2.08%	2.06%	2.03%	2.02%
Current assets	**25.75%**	**27.11%**	**25.27%**	**25.55%**	**26.89%**	**28.37%**	**29.93%**	**31.19%**
Loans	0.10%	0.07%	0.12%	0.12%	0.11%	0.11%	0.11%	0.11%
Inventories	6.70%	6.88%	6.37%	7.52%	7.50%	7.98%	8.36%	7.93%
Trade and other receivables	7.85%	8.99%	8.67%	8.92%	9.09%	9.27%	9.46%	9.70%
Derivative financial instruments	1.15%	1.10%	1.36%	1.46%	1.55%	1.65%	1.76%	1.88%
Prepayments	0.56%	0.51%	0.34%	0.34%	0.34%	0.33%	0.33%	0.33%
Current tax receivable	0.45%	0.28%	0.36%	0.36%	0.36%	0.35%	0.35%	0.35%
Other investments	0.02%	0.05%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
Cash and cash equivalents	8.92%	9.25%	7.96%	6.76%	7.87%	8.59%	9.50%	10.82%
Assets classified as held for sale	**n.a.**	**n.a.**	**n.a.**	n.a.	n.a.	n.a.	n.a.	n.a.
Total assets	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Non-current liabilities	**41.06%**	**40.28%**	**39.83%**	**40.15%**	**40.23%**	**40.40%**	**40.65%**	**41.18%**
Other payables	5.30%	5.02%	4.90%	4.89%	4.83%	4.78%	4.73%	4.70%
Derivative financial instruments	2.09%	1.36%	1.99%	1.99%	1.96%	1.94%	1.92%	1.91%
Accruals	0.18%	0.18%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%
Finance debt	19.62%	20.07%	20.00%	20.60%	21.05%	21.51%	22.00%	22.60%
Deferred tax liabilities	2.75%	2.89%	3.48%	3.75%	4.01%	4.30%	4.60%	4.95%
Provisions	7.75%	7.46%	6.28%	5.76%	5.24%	4.77%	4.34%	3.97%
Defined benefit pension plan and other post-retirement benefit plan deficits	3.37%	3.30%	2.97%	2.96%	2.93%	2.90%	2.87%	2.85%
Current liabilities	**22.16%**	**23.41%**	**24.18%**	**24.56%**	**24.75%**	**24.96%**	**25.17%**	**25.52%**
Trade and other payables	14.40%	15.99%	16.40%	16.64%	16.75%	16.87%	16.99%	17.20%
Derivative financial instruments	1.14%	1.02%	1.17%	1.17%	1.16%	1.14%	1.13%	1.12%
Accruals	1.95%	1.79%	1.64%	1.63%	1.62%	1.60%	1.58%	1.57%
Finance debt	2.52%	2.80%	3.32%	3.47%	3.60%	3.74%	3.88%	4.04%
Current tax payable	0.63%	0.61%	0.74%	0.74%	0.73%	0.73%	0.72%	0.71%
Provisions	1.52%	1.20%	0.91%	0.91%	0.90%	0.89%	0.88%	0.87%
Liabilities directly associated with assets classified as held for sale	**n.a.**	**n.a.**	**n.a.**	n.a.	n.a.	n.a.	n.a.	n.a.
Total liabilities	**63.22%**	**63.69%**	**64.01%**	**64.71%**	**64.98%**	**65.35%**	**65.82%**	**66.70%**
Share Capital	5.80%	6.33%	6.20%	6.05%	5.98%	5.92%	5.86%	5.82%
Treasury Shares	-7.58%	-6.67%	-6.01%	-5.99%	-5.92%	-5.86%	-5.79%	-5.76%
Capital Reserves	39.14%	35.36%	35.39%	36.23%	35.37%	35.12%	34.75%	34.46%
Profit (loss) for the year	0.07%	1.25%	3.39%	1.95%	2.57%	2.48%	2.37%	1.92%
Other comprehensive income	-0.38%	1.81%	-0.70%	-0.70%	-0.69%	-0.68%	-0.68%	-0.67%
Dividends	-1.79%	-2.28%	-2.43%	-2.41%	-2.44%	-2.47%	-2.46%	-2.61%
Cash flow hedges transferred to the balance sheet, net of tax	**n.a.**	**n.a.**	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Repurchase of ordinary share capital	**n.a.**	-0.12%	-0.13%	-0.13%	-0.12%	-0.12%	-0.12%	-0.12%
Share-based payments, net of tax	1.14%	0.25%	0.25%	0.25%	0.25%	0.24%	0.24%	0.24%
Share of equity-accounted entities' changes in equity, net of tax	0.04%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Transactions involving non-controlling interests, net of tax	0.34%	0.29%	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%
Adjustment on adoption of IFRS 9, net of tax	**n.a.**	**n.a.**	-0.06%	-0.06%	-0.06%	-0.06%	-0.06%	-0.06%
Total equity	**36.78%**	**36.31%**	**35.99%**	**35.29%**	**35.02%**	**34.65%**	**34.18%**	**33.30%**
BP shareholders' equity	36.19%	35.62%	35.24%	34.78%	34.48%	34.08%	33.60%	32.73%
Non-controlling interests	0.59%	0.69%	0.75%	0.51%	0.54%	0.56%	0.58%	0.57%
Total equity and liabilities	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

	0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Balance Sheet Validation	✓	✓	✓	✓	✓	✓	✓	✓

Appendix 6: Common-Size Income Statement (BP PLC)

COMMON-SIZE INCOME STATEMENT (% of Total revenues and other income)	2016	2017	2018	2019F	2020F	2021F	2022F	2023F
Sales and other operating revenues	98.07%	98.21%	98.36%	98.57%	98.63%	98.70%	98.72%	98.69%
Upstream	17.79%	18.58%	18.57%	18.82%	18.96%	19.34%	19.31%	19.39%
Downstream	89.86%	89.89%	89.12%	89.86%	89.79%	89.62%	89.58%	89.41%
Other businesses and corporate	0.89%	0.60%	0.55%	0.66%	0.77%	0.89%	1.03%	1.22%
Upstream - sales and other operating revenues between segments	-9.42%	-9.89%	-9.40%	-10.15%	-10.23%	-10.44%	-10.42%	-10.46%
Downstream - sales and other operating revenues between segments	-0.69%	-0.74%	-0.19%	-0.31%	-0.31%	-0.31%	-0.31%	-0.31%
Other businesses and corporate - sales and other operating revenues between segments	-0.35%	-0.24%	-0.29%	-0.30%	-0.35%	-0.41%	-0.47%	-0.56%
Earnings from joint ventures – after interest and tax	0.52%	0.48%	0.30%	0.22%	0.23%	0.23%	0.26%	0.25%
Earnings from associates – after interest and tax	0.53%	0.54%	0.94%	0.69%	0.64%	0.58%	0.56%	0.60%
Rosneft	0.35%	0.38%	0.75%	0.51%	0.48%	0.43%	0.42%	0.45%
Other associates	0.19%	0.17%	0.19%	0.18%	0.17%	0.15%	0.14%	0.15%
Interest and other income	0.27%	0.27%	0.25%	0.23%	0.22%	0.21%	0.20%	0.21%
Gains on sale of businesses and fixed assets	0.61%	0.49%	0.15%	0.29%	0.28%	0.28%	0.26%	0.24%
Total revenues and other income	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Purchases	-70.85%	-73.48%	-75.68%	-75.29%	-75.34%	-75.39%	-75.73%	-75.71%
Production and manufacturing expenses	-15.58%	-9.91%	-7.57%	-8.04%	-8.08%	-8.05%	-7.69%	-7.71%
Production and similar taxes	-0.37%	-0.73%	-0.51%	-0.79%	-0.61%	-0.58%	-0.60%	-0.64%
Earnings Before Interest, Taxes, Depreciation and Amortization - EBITDA	**13.20%**	**15.89%**	**16.24%**	**15.89%**	**15.97%**	**15.98%**	**15.99%**	**15.94%**
Depreciation, depletion and amortization	-7.77%	-6.37%	-5.09%	-5.94%	-4.85%	-5.18%	-5.41%	-5.78%
Upstream	-6.55%	-5.42%	-4.32%	-4.98%	-4.09%	-4.38%	-4.57%	-4.88%
Downstream	-1.04%	-0.82%	-0.68%	-0.83%	-0.67%	-0.70%	-0.73%	-0.78%
Other businesses and corporate	-0.17%	-0.12%	-0.09%	-0.12%	-0.10%	-0.10%	-0.11%	-0.11%
Impairment and losses on sale of businesses and fixed assets	0.89%	-0.50%	-0.28%	-0.73%	-0.73%	-0.35%	-0.30%	-0.44%
Exploration expense	-0.92%	-0.85%	-0.48%	-0.81%	-0.74%	-0.64%	-0.61%	-0.62%
Distribution and administration expenses	-5.62%	-4.30%	-4.01%	-4.30%	-4.47%	-4.65%	-4.57%	-4.39%
Profit (loss) before interest and taxation - EBIT	**-0.23%**	**3.87%**	**6.38%**	**4.11%**	**5.19%**	**5.15%**	**5.09%**	**4.72%**
Finance costs	-0.90%	-0.85%	-0.83%	-0.99%	-1.15%	-1.33%	-1.53%	-1.81%
Net finance expense relating to pensions and other post-retirement benefits	-0.10%	-0.09%	-0.04%	-0.07%	-0.06%	-0.06%	-0.05%	-0.06%
Profit (loss) before taxation - EBT	**-1.23%**	**2.94%**	**5.51%**	**3.05%**	**3.97%**	**3.76%**	**3.51%**	**2.85%**
Taxation	1.32%	-1.52%	-2.35%	-1.22%	-1.59%	-1.50%	-1.40%	-1.14%
Profit (loss) for the year	**0.09%**	**1.42%**	**3.15%**	**1.83%**	**2.38%**	**2.26%**	**2.10%**	**1.71%**
Attributable to								
BP shareholders	0.06%	1.39%	3.09%	1.79%	2.33%	2.21%	2.06%	1.67%
Non-controlling interests	0.03%	0.03%	0.06%	0.04%	0.05%	0.05%	0.04%	0.04%

Appendix 7: Common-Size Cash Flow Statement (BP PLC)

COMMON-SIZE CASH FLOW STATEMENT (% of CFO)	2019F	2020F	2021F	2022F	2023F
Operating activities	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
+ EBIT	52.57%	61.28%	61.43%	58.12%	48.35%
+ D&A	75.90%	57.30%	61.81%	61.82%	59.17%
- Income Taxes paid	-15.59%	-18.77%	-17.94%	-16.02%	-11.67%
- ∆ NWC	-12.87%	0.19%	-5.30%	-3.92%	4.15%
Investment Activities	**-75.49%**	**-51.80%**	**-54.39%**	**-53.81%**	**-51.35%**
- CAPEX	-67.24%	-63.90%	-65.76%	-63.94%	-60.19%
- Acquisitions, net of cash acquired	-22.19%	0.00%	0.00%	0.00%	0.00%
+/- Investment in joint ventures	0.45%	0.40%	0.39%	0.36%	0.31%
+/- Investment in associates	-0.91%	-0.83%	-0.82%	-0.77%	-0.70%
+/- Other Investments	0.45%	0.21%	0.03%	-0.10%	-0.09%
+ Divestments	13.95%	12.32%	11.78%	10.65%	9.32%
Financing Activities	**-38.56%**	**-35.28%**	**-36.79%**	**-36.10%**	**-36.04%**
Net issue (repurchase) of shares	-1.50%	0.00%	0.00%	0.00%	0.00%
- Interes paid	-13.59%	-14.36%	-16.57%	-18.07%	-19.17%
- Dividends paid	-28.86%	-26.73%	-26.80%	-24.96%	-23.84%
∆ Debt	5.39%	5.80%	6.59%	6.93%	6.97%
Increase (decrease) in cash and cash equivalents	-14.05%	12.92%	8.83%	10.09%	12.60%
Cash and cash equivalents at beginning of year	94.96%	73.19%	84.35%	86.23%	86.30%
Cash and cash equivalents at end of year	**80.92%**	**86.11%**	**93.17%**	**96.32%**	**98.90%**

Appendix 8: Macroeconomic and Industry Assumptions

	Units	2018	2019F	2020F	2021F	2022F	2023F	Assumption
MACROECONOMIC ASSUMPTIONS								
Inflation rate, average consumer prices (Annual percent change) - World	%	3.60	3.60	3.60	3.50	3.50	3.40	Source: International Monetary Fund
Real GDP growth (Annual percent change) - World	%	3.60	3.30	3.60	3.60	3.60	3.60	Source: International Monetary Fund
Population (Millions of people)	Millions	7,462	7,545	7,627	7,710	7,794	7,875	Source: International Monetary Fund
GBP/USD - Forecast	(£ / $)		1.21	1.15	1.13	1.16	1.17	Source: Bloomberg data
GBP/GBX - Conversion	(£ / £)	100	100	100	100	100	100	-
OIL & GAS INDUSTRY ASSUMPTIONS								
Average Brent - Oil price	$ per barrel	71.31	67.00	67.00	67.00	69.50	69.50	Source: BP Annual Reports, Bloomberg, Deloitte forecast and EIA forecast
Average Henry Hub - Gas price	$ per Mmbtu	3.09	2.77	2.77	3.30	3.40	3.40	Source: BP Annual Reports, Bloomberg, Deloitte forecast and EIA forecast
Conversion Factor - Natural gas to oil equivalent	(mmcf/boe)	5.80	5.80	5.80	5.80	5.80	5.80	Source: BP Annual Reports

Appendix 9: Income Statement Assumptions

	Units	2018	2019F	2020F	2021F	2022F	2023F	Assumption
GROUP INCOME STATEMENT ASSUMPTIONS								
Sales and other operating revenues	US$	298,756	298,068	304,758	314,339	325,265	325,586	-
Upstream	US$	56,399	56,902	58,600	61,606	63,610	63,967	-
Production - Liquids (mb/d)	mb/d	1,268	1,381	1,419	1,458	1,464	1,470	Source: BP Annual Reports and Author's estimation
Realization - Liquids ($/bbl)	($/bbl)	64.98	60.55	60.44	60.49	62.74	63.06	Source: BP Annual Reports and Author's estimation by inference from market price
Production - Natural gas (mmcf/d)	mmcf/d	7,374	7,116	7,310	7,508	7,539	7,570	Source: BP Annual Reports and Author's estimation
Realization - Natural gas ($/mcf)	($/mcf)	3.92	3.52	3.43	4.06	4.07	4.10	Source: BP Annual Reports and Author's estimation by inference from market price
Production - Hydrocarbons (mboe/d)	mboe/d	2,539	2,608	2,679	2,752	2,763	2,775	Source: BP Annual Reports and Author's estimation
Realization - Hydrocarbons ($/boe)	($/boe)	43.47	42.30	42.82	43.05	44.26	44.16	Source: BP Annual Reports and Author's estimation by inference from market price
Downstream	US$	270,689	271,726	277,445	285,421	295,163	294,966	-
Sale of crude oil through spot and term contracts	US$	62,484	57,939	57,939	57,939	60,568	60,568	Source: BP Annual Reports and Author's estimation by inference from market price
Marketing, spot and term sales of refined products	US$	195,020	204,381	210,272	216,621	223,942	223,949	Source: BP Annual Reports and Author's estimation by inference from market price
Other sales and operating revenues	US$	13,185	9,406	9,234	10,861	10,653	10,450	Source: BP Annual Reports and Author's estimation by inference from market price
Other businesses and corporate	US$	1,678	2,000	2,383	2,840	3,384	4,033	Growth for Other businesses and corporate is expected at 19.17% YoY.
Upstream - sales and other operating revenues between segments	US$	(28,565)	(30,704)	(31,620)	(33,242)	(34,323)	(34,516)	Growth is expected at 6 years average of % Upstream.
Downstream - sales and other operating revenues between segments	US$	(574)	(941)	(961)	(989)	(1,023)	(1,022)	Growth is expected at 6 years average of % Downstream.
Other businesses and corporate - sales and other operating revenues between segments	US$	(871)	(914)	(1,089)	(1,298)	(1,546)	(1,843)	Growth is expected at 6 years average of % Other businesses and corporate.
Earnings from joint ventures – after interest and tax	US$	897	672	709	732	859	841	Growth is expected at 6 years average.
Earnings from associates – after interest and tax	US$	2,856	2,094	1,986	1,850	1,852	1,994	Growth is expected at 6 years average.
Interest and other income	US$	773	695	681	654	661	687	Growth is expected at 6 years average.
Gains on sale of businesses and fixed assets	US$	456	872	867	907	862	793	Growth is expected at 5 years average.
Purchases	US$	(229,878)	(227,676)	(232,786)	(240,104)	(249,528)	(249,774)	Source: BP Annual Reports and Author's estimation by inference from market price.
Production and manufacturing expenses	US$	(23,005)	(24,300)	(24,961)	(25,640)	(25,326)	(25,430)	Source: BP Annual Reports and Author's estimation by inference from market price.
Production and similar taxes	US$	(1,536)	(2,378)	(1,892)	(1,839)	(1,968)	(2,095)	Growth is expected at 6 years average of % Revenues.
Depreciation, depletion and amortization	US$	(15,457)	(17,957)	(14,988)	(16,506)	(17,837)	(19,053)	-
Upstream	US$	(13,118)	(15,065)	(12,627)	(13,949)	(15,071)	(16,105)	Growth is expected at 6 years average of % CAPEX.
Downstream	US$	(2,077)	(2,519)	(2,067)	(2,234)	(2,413)	(2,580)	Growth is expected at 6 years average of % CAPEX.
Other businesses and corporate	US$	(262)	(373)	(295)	(322)	(352)	(368)	Growth is expected at 6 years average of % CAPEX.
Impairment and losses on sale of businesses and fixed assets	US$	(860)	(2,208)	(2,249)	(1,130)	(1,000)	(1,444)	Growth is expected at 6 years average.
Exploration expense	US$	(1,445)	(2,445)	(2,279)	(2,054)	(2,004)	(2,051)	Growth is expected at 6 years average.
Distribution and administration expenses	US$	(12,179)	(12,998)	(13,815)	(14,807)	(15,065)	(14,482)	Growth is expected at 6 years average of % Revenues.
Finance costs	US$	(2,528)	(3,003)	(3,568)	(4,239)	(5,037)	(5,984)	Growth for Finance costs is expected at 18,81% YoY.
Net finance expense relating to pensions and other post-retirement benefits	US$	(127)	(211)	(187)	(186)	(178)	(190)	Growth is expected at 6 years average.
Taxation	US$	(7,145)	(3,690)	(4,910)	(4,791)	(4,623)	(3,759)	ETR in 2019 is expected to be around 40% Source: BP Annual Reports

Appendix 10: Statement of Financial Position Assumptions

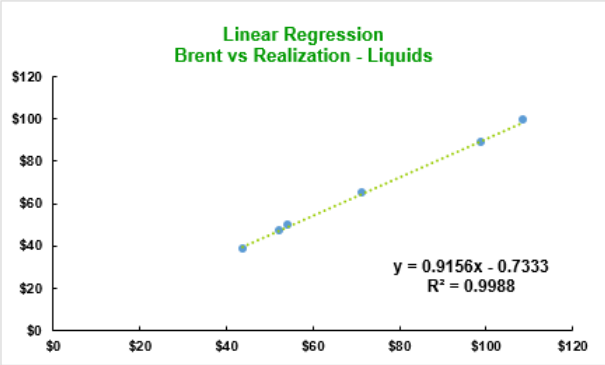
	Units	2018	2019F	2020F	2021F	2022F	2023F	Assumption
GROUP BALANCE SHEET								
Non-current assets (Millions of U.S. Dollars)	**US$**							-
Fixed assets								-
Property, plant and equipment	US$	135,261	135,734	133,754	131,294	128,451	125,428	PP&E t+1 = PP&E t – D&A t+1 + CAPEX t+1 - Divestments t+1 + Acquisitions t+1
Goodwill	US$	12,204	12,204	12,204	12,204	12,204	12,204	Goodwill is subject to Impairment Testing and assumed to remain constant over the period.
Intangible assets	US$	17,284	16,712	17,195	17,563	17,947	18,301	IA t+1 = IA t - D&A t+1 + CAPEX t+1
Investments in joint ventures	US$	8,647	8,541	8,436	8,332	8,229	8,128	Growth for Investments in joint ventures is expected at -1,23% YoY.
Investments in associates	US$	17,673	17,888	18,106	18,326	18,549	18,775	Growth for Investments in associates is expected at 1,22% YoY.
Other investments	US$	1,341	1,236	1,181	1,173	1,201	1,229	Growth for Other investments is expected at 6 years average.
Loans	**US$**	**637**	**637**	**637**	**637**	**637**	**637**	**Loans assumed to remain constant over the forecasted period.**
Trade and other receivables	**US$**	**1,834**	**1,834**	**1,834**	**1,834**	**1,834**	**1,834**	**Trade and other receivables assumed to remain constant over the forecasted period.**
Derivative financial instruments	**US$**	**5,145**	**5,145**	**5,145**	**5,145**	**5,145**	**5,145**	**Derivative financial instruments assumed to remain constant over the forecasted period.**
Prepayments	**US$**	**1,179**	**1,179**	**1,179**	**1,179**	**1,179**	**1,179**	**Prepayments assumed to remain constant over the forecasted period.**
Deferred tax assets	**US$**	**3,706**	**3,706**	**3,706**	**3,706**	**3,706**	**3,706**	**Deferred tax assets assumed to remain constant over the forecasted period.**
Defined benefit pension plan surpluses	**US$**	**5,955**	**5,955**	**5,955**	**5,955**	**5,955**	**5,955**	**Defined benefit pension plan surpluses assumed to remain constant over the forecasted period.**
Current assets (Millions of U.S. Dollars)	**US$**							-
Loans	**US$**	**326**	**326**	**326**	**326**	**326**	**326**	**Loans assumed to remain constant over the forecasted period.**
Inventories	**US$**	**17,988**	**21,279**	**21,466**	**23,109**	**24,458**	**23,328**	**Growth for Inventories is expected at 6 years average of %Revenues.**
Trade and other receivables	**US$**	**24,478**	**25,242**	**26,029**	**26,841**	**27,678**	**28,542**	**Growth for Trade and other receivables is expected at 3,12% YoY.**
Derivative financial instruments	**US$**	**3,846**	**4,136**	**4,447**	**4,782**	**5,142**	**5,530**	**Growth for Derivative financial instruments is expected at 7.43% YoY.**
Prepayments	**US$**	**963**	**963**	**963**	**963**	**963**	**963**	**Prepayments assumed to remain constant over the forecasted period.**
Current tax receivable	**US$**	**1,019**	**1,019**	**1,019**	**1,019**	**1,019**	**1,019**	**Current tax receivable assumed to remain constant over the forecasted period.**
Other investments	**US$**	**222**	**222**	**222**	**222**	**222**	**222**	**Other investments assumed to remain constant over the forecasted period.**
Assets classified as held for sale	**US$**	-	-	-	-	-	-	**Assumed to remain constant, with Zero Balance.**
Non-current liabilities (Millions of U.S. Dollars)								-
Other payables	**US$**	**13,830**	**13,830**	**13,830**	**13,830**	**13,830**	**13,830**	**Other payables assumed to remain constant over the forecasted period.**
Derivative financial instruments	**US$**	**5,625**	**5,625**	**5,625**	**5,625**	**5,625**	**5,625**	**Derivative financial instruments assumed to remain constant over the forecasted period.**
Accruals	**US$**	**575**	**575**	**575**	**575**	**575**	**575**	**Accruals assumed to remain constant over the forecasted period.**
Finance debt	**US$**	**56,426**	**58,315**	**60,266**	**62,284**	**64,368**	**66,523**	**Growth for Finance debt is expected at 3.35% YoY.**
Deferred tax liabilities	**US$**	**9,812**	**10,618**	**11,490**	**12,434**	**13,456**	**14,562**	**Deferred tax liabilities is expected at 8.22% YoY.**
Provisions	**US$**	**17,732**	**16,312**	**15,006**	**13,804**	**12,699**	**11,682**	**Growth for Provisions is expected at -8,01% YoY.**
Defined benefit pension plan and other post-retirement benefit plan deficits	**US$**	**8,391**	**8,391**	**8,391**	**8,391**	**8,391**	**8,391**	**Defined benefit pension plan and other assumed to remain constant over the forecasted period.**
Current liabilities (Millions of U.S. Dollars)								-
Trade and other payables	**US$**	**46,265**	**47,104**	**47,959**	**48,829**	**49,715**	**50,617**	**Growth for Trade and other payables is expected at 1.81% YoY.**
Derivative financial instruments	**US$**	**3,308**	**3,308**	**3,308**	**3,308**	**3,308**	**3,308**	**Derivative financial instruments assumed to remain constant over the forecasted period.**
Accruals	**US$**	**4,626**	**4,626**	**4,626**	**4,626**	**4,626**	**4,626**	**Accruals assumed to remain constant over the forecasted period.**
Finance debt	**US$**	**9,373**	**9,832**	**10,313**	**10,818**	**11,347**	**11,903**	**Growth for Finance debt is expected at 4.89% YoY.**
Current tax payable	**US$**	**2,101**	**2,101**	**2,101**	**2,101**	**2,101**	**2,101**	**Current tax payable assumed to remain constant over the forecasted period.**
Provisions	**US$**	**2,564**	**2,564**	**2,564**	**2,564**	**2,564**	**2,564**	**Provisions assumed to remain constant over the forecasted period.**
Liabilities directly associated with assets classified as held for sale	**US$**	-	-	-	-	-	-	**Assumed to remain constant, with Zero Balance.**
Equity (Millions of U.S. Dollars)								-
Share Capital	**US$**	**17,490**	**17,135**	**17,135**	**17,135**	**17,135**	**17,135**	**Continued share buyback programme, which is expected to fully offset the impact of scrip dilution since the third quarter of 2017 by the end of 2019. Source: BP Annual Reports After 2019, constant level of Share Capital. It is assumed that there will be no issued capital or repurchases of Shares.**
Treasury Shares	**US$**	**(16,958)**	**(16,958)**	**(16,958)**	**(16,958)**	**(16,958)**	**(16,958)**	**Constant level of Treasury Shares. It is assumed that there will be no issued capital or repurchases of Shares.**
Capital Reserves	**US$**	**99,872**	**102,581**	**101,288**	**101,660**	**101,689**	**101,420**	**Capital Reserves t+1 = Capital Reserves t + Profit (loss) for the year + Dividends t - Δ Dividends**
Profit (loss) for the year	**US$**	**9,578**	**5,535**	**7,365**	**7,186**	**6,934**	**5,638**	-
Other comprehensive income	**US$**	**(1,980)**	**(1,980)**	**(1,980)**	**(1,980)**	**(1,980)**	**(1,980)**	**Other comprehensive income assumed to remain constant over the forecasted period.**
Dividends	**US$**	**(6,869)**	**(6,828)**	**(6,992)**	**(7,158)**	**(7,202)**	**(7,676)**	**BP pretends a progressive dividend. Source: BP Annual Reports**
Cash flow hedges transferred to the balance sheet, net of tax	**US$**	**26**	**26**	**26**	**26**	**26**	**26**	**Cash flow hedges assumed to remain constant over the forecasted period.**
Share-based payments, net of tax	**US$**	**703**	**703**	**703**	**703**	**703**	**703**	**Share-based payments, net of tax assumed to remain constant over the forecasted period.**
Share of equity-accounted entities' changes in equity, net of tax	**US$**	**14**	**14**	**14**	**14**	**14**	**14**	**Share of equity-accounted entities assumed to remain constant over the forecasted period.**
Transactions involving non-controlling interests, net of tax	**US$**	**207**	**207**	**207**	**207**	**207**	**207**	**Transactions assumed to remain constant over the forecasted period.**
Adjustment on adoption of IFRS 9, net of tax	**US$**	**(180)**	**(180)**	**(180)**	**(180)**	**(180)**	**(180)**	**Adjustment assumed to remain constant over the forecasted period.**

Appendix 11: Upstream Segment Assumptions

Liquids - Estimates:

- Liquids realization was calculated by statistical inference, calculating the correlation between the Average Brent – Oil price (historical) and BP's realization (historical). Such an estimate is shown by the following graph.

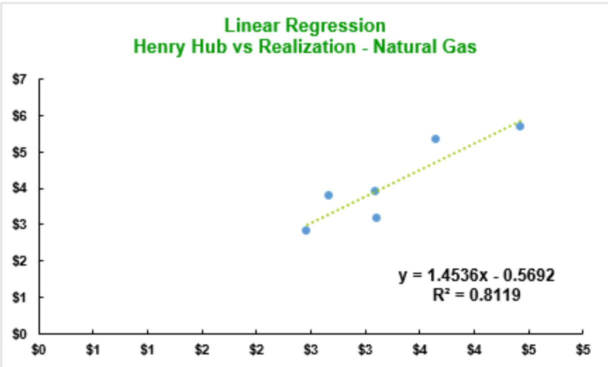
Correlation	0.999



Natural Gas - Estimates:

- Natural Gas realization was calculated by statistical inference, calculating the correlation between the Average Henry Hub – Gas price (historical) and BP's realization (historical). Such an estimate is shown by the following graph.

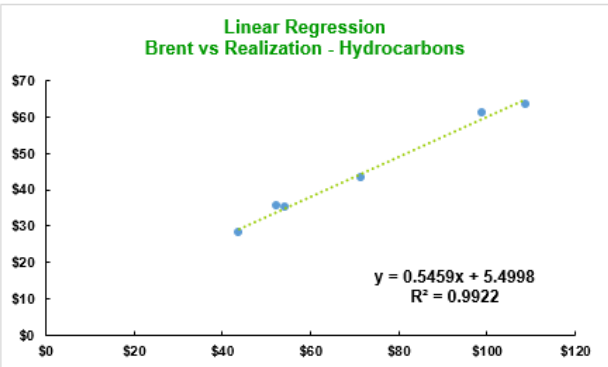
Correlation	0.901



Hydrocarbons - Estimates:

- Hydrocarbons realization was calculated by statistical inference, calculating the correlation between the Average Brent – Gas price (historical) and BP's realization (historical). Such an estimate is shown by the following graph.

Correlation	0.996

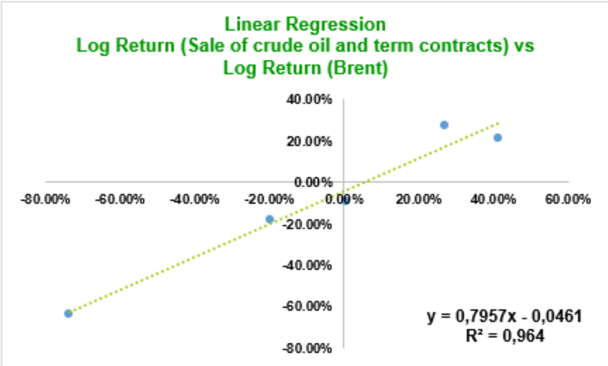


Appendix 12: Downstream Segment Assumptions

Sale of crude oil through spot and term contracts - Estimates:

- Sales of crude oil through spot and term contracts was calculated by statistical inference, calculating the correlation between the Log Return of Average Brent – Gas price (historical) and Log Return of BP's Sales of crude oil through spot and term contracts (historical). Such an estimate is shown by the following graph.

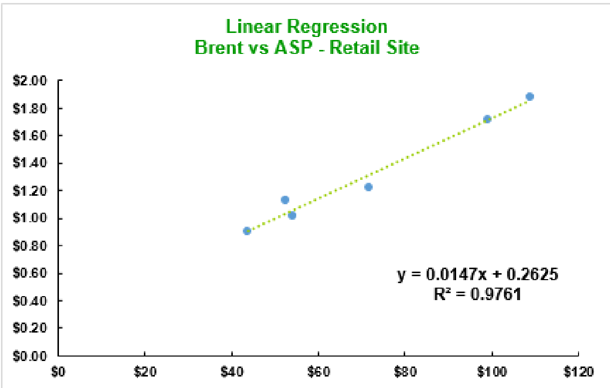
Correlation	0.982
Linear Trend	1.211



Average selling price by retail site - Estimates:

- Average selling price by retail site was calculated by statistical inference, calculating the correlation between the Average Brent – Gas price (historical) and BP's Average selling price by retail site (historical). Such an estimate is shown by the following graph.

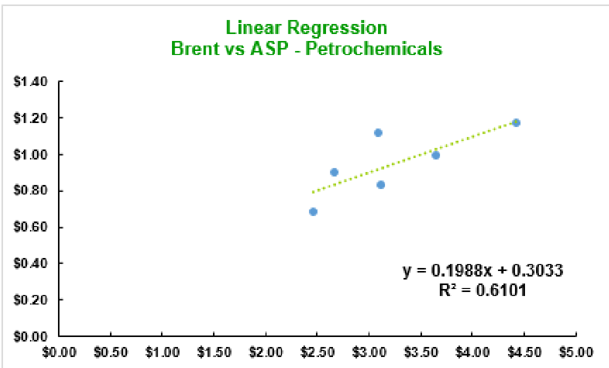
Correlation	0.988



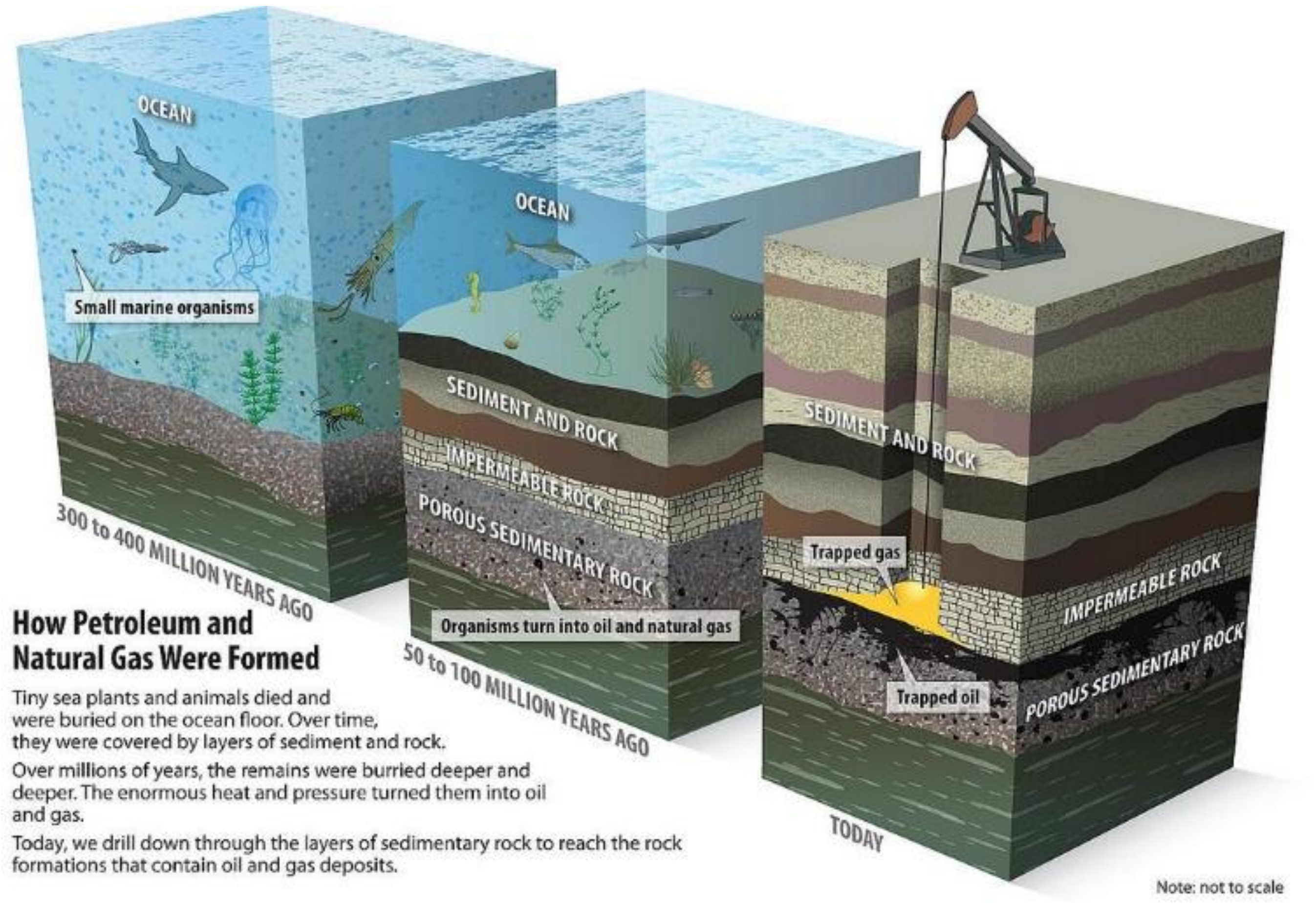
Average selling price Petrochemicals - Estimates:

- Average selling price Petrochemicals was calculated by statistical inference, calculating the correlation between the Average Henry Hub – Gas price (historical) and BP's Average selling price Petrochemicals (historical). Such an estimate is shown by the following graph.

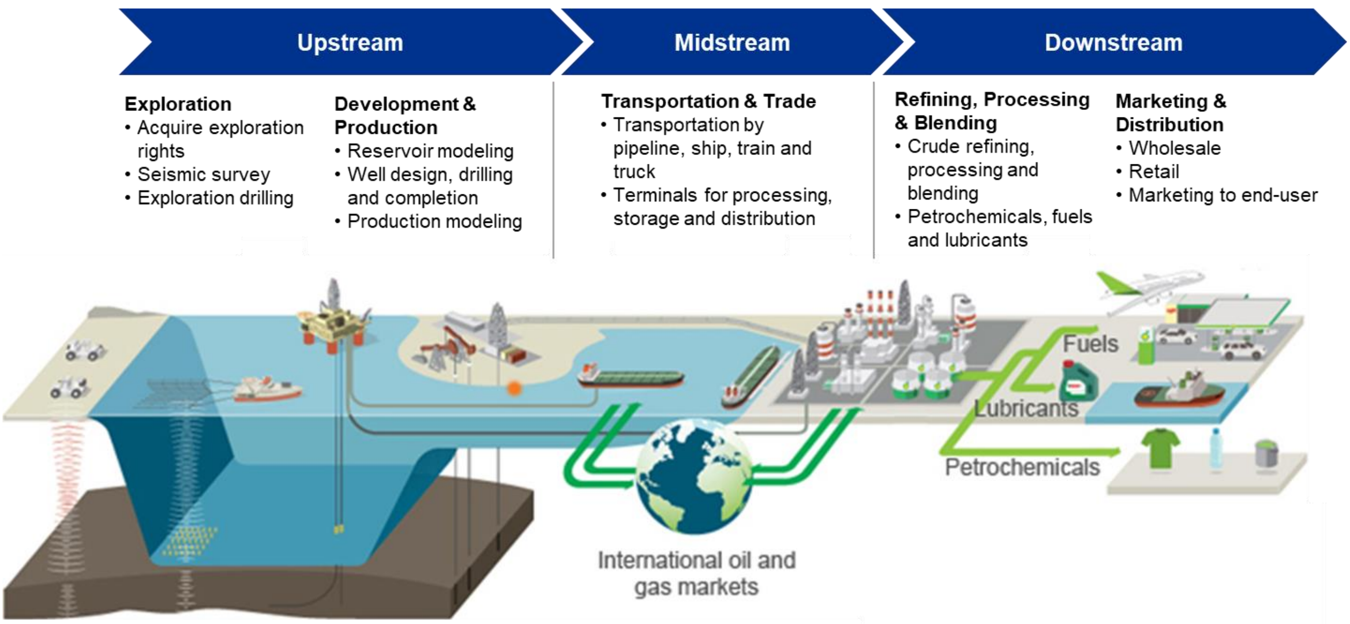
Correlation	0.781



Appendix 13: How Petroleum and Natural Gas were Formed

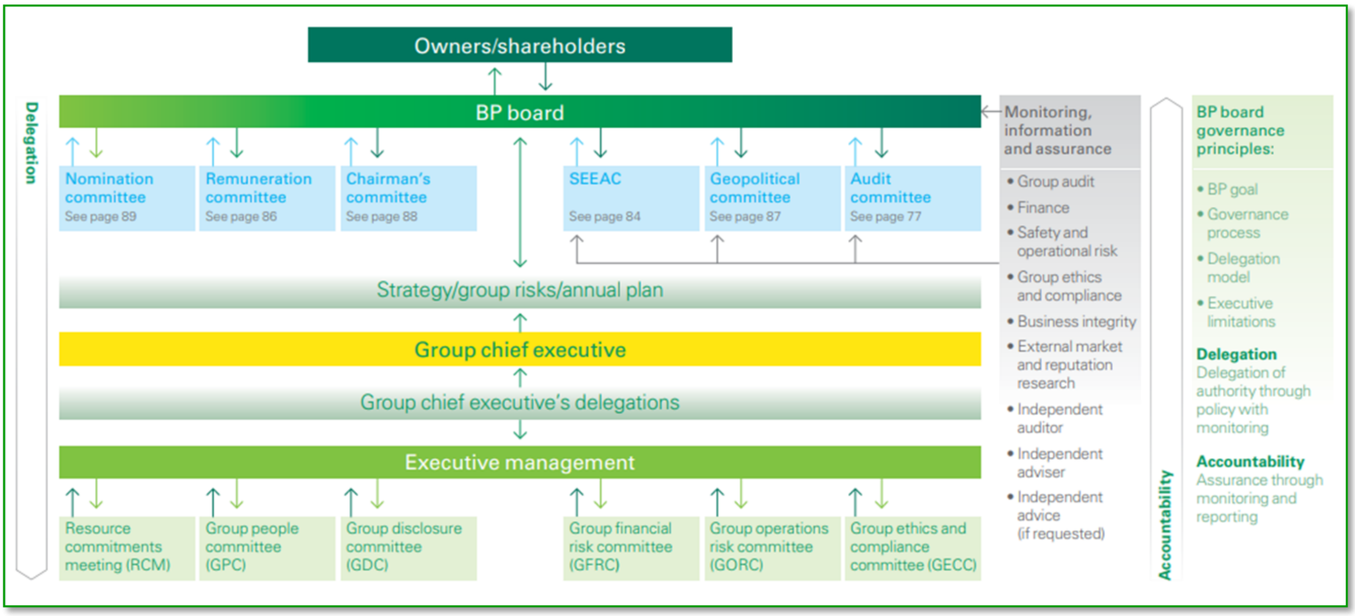


Appendix 14: Oil & Gas Industry Value Chain



Infograpic: BP

Appendix 15: BP's Governance Model



Appendix 16: BoD Remuneration

BP policy approach is based on 4 pillars, simplification, reduced package versus previous policy, link to strategy and stewardship. In its Directors' remuneration report, BP subdivides into 3 distinct categories: Executive Directors, Non-executive Chairman and Non-executive Directors.

Executive Directors:

- **Salary and benefits** – Fixed pay policy is unchanged. Reflects the scale and complexity of the role while recognizing competitive practice in the relevant market;
- **Retirement benefits** – To recognize competitive practice in home country. Not directly linked to performance;
- **Annual bonus** – To provide variable remuneration dependent on performance against annual financial, operational and safety measures;
- **Performance shares** – To link the largest part of remuneration opportunity with the long-term performance of the business;
- **Shareholding requirements** – To provide alignment between the interests of executive directors and our other shareholders.

Non-executive Chairman:

- **Fees** – Remuneration is in the form of cash fees, payable monthly. The level and structure of the chairman's remuneration will primarily be compared against UK best practice. Reviewed annually by the remuneration committee, which makes a recommendation to the board;
- **Benefits and expenses** – The Chairman provided with an office and full-time secretarial and administrative support and reasonable travelling expenses.

Non-executive Directors:

- **Fees** – Remuneration is in the form of cash fees, payable monthly. Remuneration practice is consistent with recognized best practice standards for non-executive directors' remuneration and, as a UK-listed company, the level and structure of non-executive directors' remuneration will primarily be compared against UK best practice;
- **Benefits and expenses** – Non-executive directors receive an allowance to reflect the global nature of the company's business. They are provided with administrative support and reasonable travelling expenses.

Executive Directors

Elements of package	Bob Dudley (thousand)		Brian Gilvary (thousand)	
Salary and benefits	$	1,933	£	836.00
Retirement benefits		-	£	269.00
Annual bonus	$	1,690	£	706.00
Performance shares	$	11,043	£	4,083.00
Discontinued plans		-	£	2,083.00
Total remuneration	**$**	**14,666**	**£**	**7,977.00**

Non-executive Chairman

Elements of package	Carl-Henric Svanberg (thousand)	
Fees	£	785
Benefits	£	24
Total remuneration	**£**	**809**

Non-executive Directors

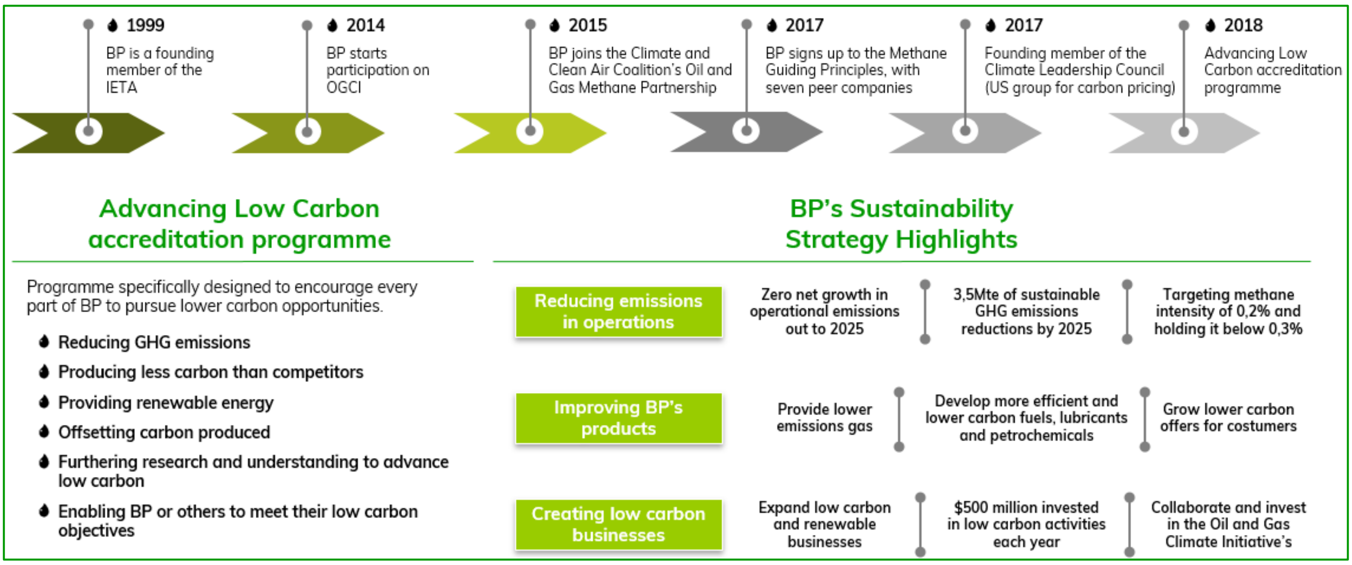
Elements of package	Fees (thousand)		Benefits (thousand)		Total remuneration	
Nils Andersen	£	132	£	11	£	143
Paul Anderson	£	69	£	6	£	75
Alan Boeckmann	£	155	£	10	£	165
Admiral Frank Bowman	£	160	£	14	£	174
Dame Alison Carnwath	£	74	£	47	£	121
Pamela Daley	£	55	£	42	£	97
Ian Davis	£	170	£	2	£	172
Professor Dame Ann Dowling	£	158	£	2	£	160
Helge Lund	£	46	£	122	£	168
Melody Meye	£	160	£	26	£	186
Brendan Nelson	£	150	£	12	£	162
Paula Rosput Reynolds	£	166	£	33	£	199
Sir John Sawers	£	150	£	1	£	151

Background and diversity

Non-executive director	Background: Oil and gas/ extractives/ energy	Engineering/ technology	Financial expertise	Safety	Brand/ marketing/ reputation	Regulatory/ government affairs	Diversity: Female	Non UK/US	Tenure (years)
Nils Andersen	◆				◆			◆	3
Alan Boeckmann	◆	◆		◆					5
Frank Bowman		◆		◆		◆			8
Alison Carnwath		◆	◆			◆	◆		1
Pamela Daley	◆		◆			◆	◆		1
Ian Davis	◆				◆	◆			9
Ann Dowling		◆					◆		6
Helge Lund	◆		◆	◆		◆		◆	1
Melody Meyer	◆	◆		◆			◆		2
Brendan Nelson			◆			◆			8
Paula Reynolds	◆		◆				◆		4
John Sawers				◆		◆			4

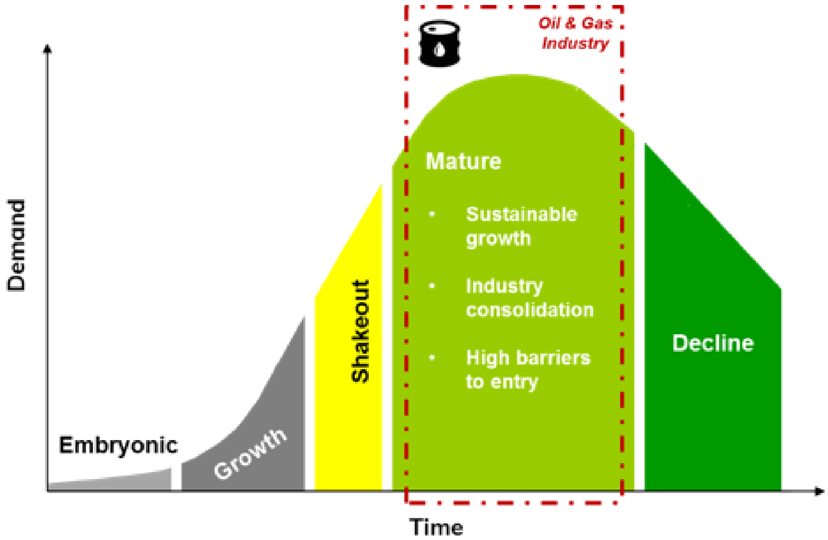
Appendix 17: BP's Social Responsibility

BP is a company that already has more than two decades of taking actions on climate change. Active participation on several initiatives with the concern in the reduction of emissions.



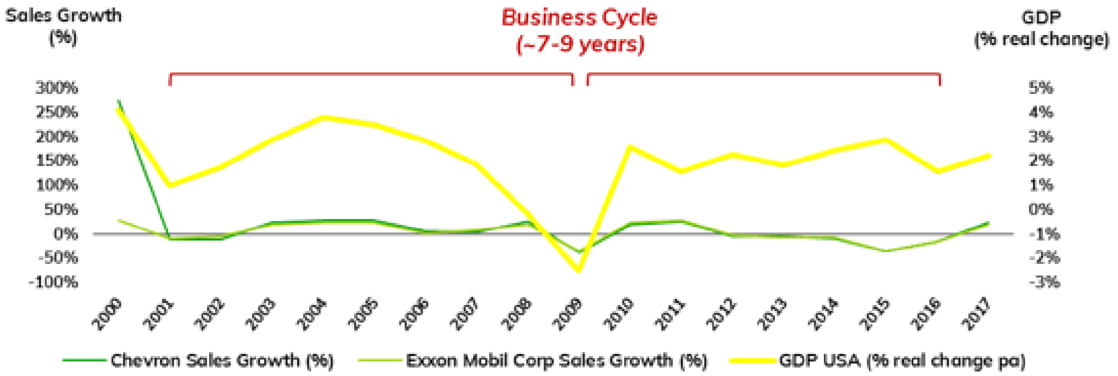
Appendix 18: Industry Life Cycle

Matured Industry, in which market growth expectations are lower but presence of its players is high.



Appendix 19: Industry Business Cycle

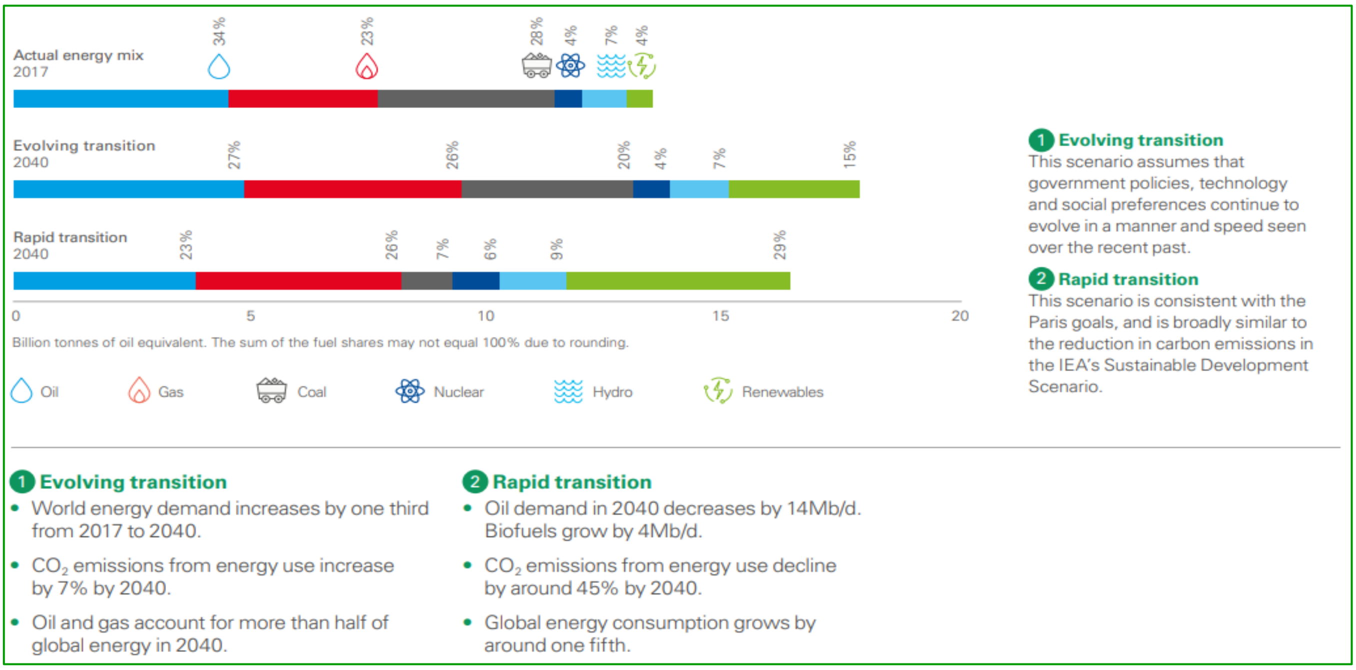
Business cycle of 7 to 9 years. The market structure is an Oligopoly composed of a small set of large players that influence the direction of the market and a group of small companies conditioned by them.



Source: Author's estimates

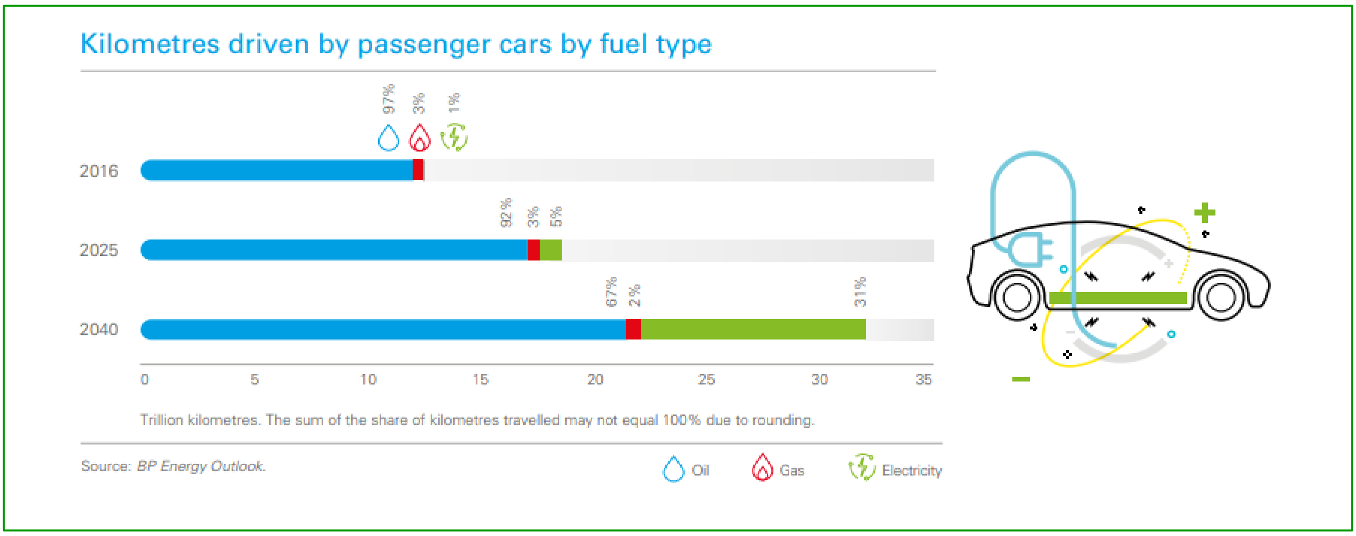
Appendix 20: Energy consumption – 2040 projections

In line with the transition to a low carbon economy, BP in its annual report presents a projection of energy consumption by 2040, dividing into two possible scenarios.

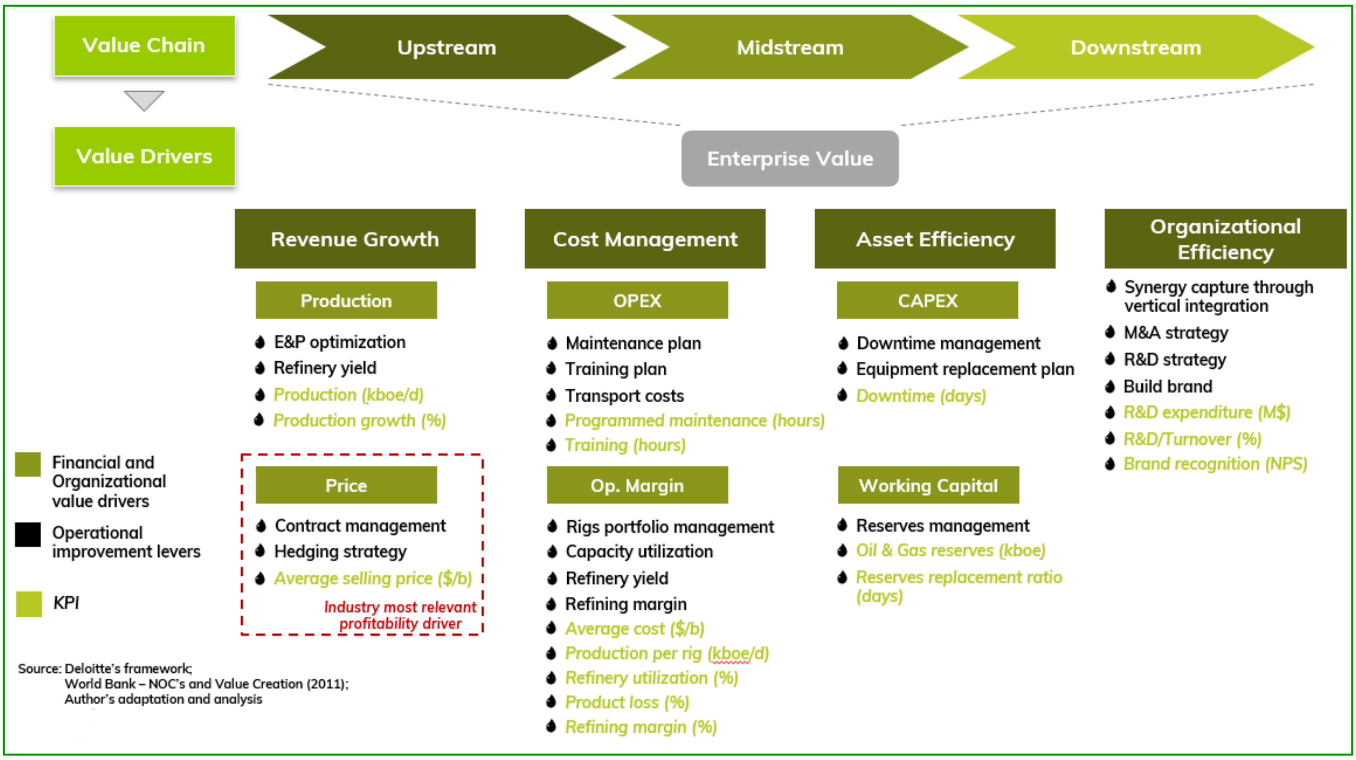


Appendix 21: Evolution of electric vehicles – 2040 projections

According to the electrification of vehicles, BP projects by 2040 how the use of vehicles by fuel type will evolve.



Appendix 22: Key Drivers of Profitability



Appendix 23: Industry Peers

Industry peers were selected based in the Bloomberg Integral Oil Companies (IOC Group). This Group comprises the companies that operate in the three levels of the value chain (i.e. upstream, midstream and downstream) and are publicly traded.

Peer Group Criteria

- 32 Bloomberg Integrated Oil Companies (IOC)
- Top 5 companies by production
- Top 5 companies by market capitalization
- Publicly traded
- Worldwide presence

Company	Market Share	
	All Companies	Among IOC
BP PLC	2%	11%
Exxon Mobil Corporation	2%	10%
Royal Dutch Shell PLC	2%	9%
Chevron Corporation	2%	9%
TOTAL S.A.	2%	7%
Other IOC	11%	54%
Other*	80%	-

Other*: includes state owned companies, not traded IOC and traded companies which are not IOC

Source: Bloomberg (2017 data); Author's analysis

IOC Company's Strategies

- Diversification in emerging markets
- Strategic agreements and partnerships
- Portfolio optimization
- Increase profits and returns by using competitive advantages
- Mergers and acquisitions
- Business model integration
- Increase production
- Maximize value from technology

GICS - Integrated Oils

Companies	Ticker	Market Capitalization (GBP)	Normalized ROE	Long- and short-term Debt Ratio (%)	EPS Growth (%)	EBIT_MARGIN
TOTAL SA	FP FP Equity	111,308,607,984	10.56%	43.65%	3.61%	8.90%
AVADH SUGAR & EN	AVADHSUG IN Equity	56,271,601	26.70%	305.26%	19.23%	11.79%
HIBISCS	HIBI MK Equity	294,529,112	20.33%	0.39%	28.97%	43.87%
BASHNEFT	BANE RM Equity	4,044,780,954	22.00%	27.41%	13.87%	14.48%
PGNIG	PGN PW Equity	5,927,346,344	7.10%	10.11%	-39.37%	7.13%
ROYAL DUTCH SH-A	RDSA LN Equity	184,111,264,070	9.89%	37.93%	-6.32%	7.76%
NIS AD NOVI SAD	NIIS SG Equity	843,307,150	7.37%	30.85%	3.48%	8.44%
PETROCHINA-H	857 HK Equity	125,494,372,014	7.23%	28.85%	6.55%	5.15%
CENOVUS ENERGY	CVE CN Equity	9,444,246,498	8.63%	52.46%	142.32%	3.01%
BP PLC	BP/ LN Equity	103,323,346,020	12.60%	64.80%	-17.90%	5.01%
CHEVRON CORP	CVX US Equity	186,659,648,555	9.63%	22.14%	-10.35%	9.29%
EXXON MOBIL CORP	XOM US Equity	246,623,208,357	9.58%	19.04%	-37.06%	6.62%
REPSOL SA	REP SM Equity	19,819,418,576	6.57%	44.49%	8.26%	4.46%
IMPERIAL OIL	IMO CN Equity	16,320,916,673	12.67%	21.15%	-6.33%	9.87%
SUNCOR ENERGY	SU CN Equity	38,581,828,488	12.37%	39.43%	29.02%	17.70%
OMV AG	OMV AV Equity	13,586,039,355	18.68%	40.11%	7.77%	14.71%
YPF SA-D	YPFD AR Equity	3,387,812,778	4.96%	92.47%	-58.72%	7.61%
PETROBRAS-PREF	PETR4 BZ Equity	74,545,226,334	9.47%	115.28%	11.29%	23.65%
ENI SPA	ENI IM Equity	45,262,774,314	8.87%	50.64%	-13.98%	12.63%
SINOPEC CORP-H	386 HK Equity	69,874,807,677	7.98%	17.31%	0.98%	2.31%
GAZPROM	GAZP RM Equity	69,416,875,860	13.22%	28.05%	-3.24%	22.61%
LUKOIL	LKOH RM Equity	48,880,557,130	18.17%	12.93%	-0.15%	11.04%
OMV PETROM SA	SNP RO Equity	4,364,021,378	14.03%	2.96%	-4.26%	23.69%
GALP ENERGIA	GALP PL Equity	9,640,780,630	15.43%	53.66%	-2.18%	7.57%
GAZPROM NEFT	SIBN RM Equity	24,864,685,400	23.83%	40.21%	11.76%	18.86%
ROSNEFT	ROSN RM Equity	54,985,909,790	20.19%	93.18%	24.76%	14.85%
ECOPETROL	ECOPETL CB Equity	29,246,416,714	23.25%	64.18%	0.87%	30.60%
EQUINOR ASA	EQNR NO Equity	51,493,481,254	15.09%	59.84%	-18.95%	26.09%
TATNEFT	TATN RM Equity	21,505,142,117	27.69%	28.04%	1.43%	29.96%
PTT PCL	PTT TB Equity	34,550,408,940	12.42%	41.23%	-2.10%	7.31%
MOL	MOL HB Equity	6,411,312,657	18.10%	30.32%	-14.19%	5.86%
SURGUTNEFTEGAS	SNGS RM Equity	16,371,770,994	21.96%	4.88%	-65.37%	26.68%

Source: Bloomberg Data @15-09-2019

Appendix 24: SARD Approach

Complementary to the peer group selection, a different method was tested, the Sum of Absolute Rank Differences (SARD) approach developed by Knudsen et al. (2017). The SARD approach is a method that minimizes the rank differences of fundamental factors under analysis between comparable companies against the subject company. Thus, the SARD variables were ROE, Debt to Equity, Market Cap, EPS Growth and EBIT Margin. As a result, a peer group of 10 companies was reached. Formally, this framework is expressed by the following formula, representing the SARD between company *i* (the subject company) and company *j* (the comparable company):

$$SARD_{i,j} = |r_{1,i} - r_{1,j}| + |r_{2,i} - r_{2,j}| + \dots + |r_{n,i} - r_{n,j}| = \sum_{k=1}^{n} |r_{k,i} - r_{k,j}|$$

		SARD Variables					Rank					Diference					SARD	
Company	Ticker	ROE	Debt to Equity	Market Cap (GBP)	EPS Growth	EBIT Margin	ROE	Debt to Equity	Market Cap (GBP)	EPS Growth	EBIT Margin	ROE	Debt to Equity	Market Cap (GBP)	EPS Growth	EBIT Margin	SARD	Rank
TOTAL SA	FP FP Equity	10.56%	43.65%	111,308,607,984.45	3.61%	8.90%	13	21	28	21	14	3	7	1	15	10	36	3
ROYAL DUTCH SH-A	RDSA LN Equity	9.89%	37.93%	184,111,264,069.97	-6.32%	7.76%	12	16	30	11	12	4	12	3	5	8	32	1
PETROCHINA-H	857 HK Equity	7.23%	28.85%	125,494,372,013.93	6.55%	5.15%	4	13	29	22	5	12	15	2	16	1	46	10
BP PLC	BP/ LN Equity	12.60%	64.80%	103,323,346,019.92	-17.90%	5.01%	16	28	27	6	4	0	0	0	0	0	0	0
CHEVRON CORP	CVX US Equity	9.63%	22.14%	186,659,648,554.54	-10.35%	9.29%	11	9	31	9	15	5	19	4	3	11	42	8
EXXON MOBIL CORP	XOM US Equity	9.58%	19.04%	246,623,208,356.95	-37.06%	6.62%	10	7	32	4	7	6	21	5	2	3	37	5
ENI SPA	ENI IM Equity	8.87%	50.64%	45,262,774,313.71	-13.98%	12.63%	8	23	20	8	19	8	5	7	2	15	37	5
GALP ENERGIA	GALP PL Equity	15.43%	53.66%	9,640,780,630.01	-2.18%	7.57%	21	25	10	14	10	5	3	17	8	6	39	7
EQUINOR ASA	EQNR NO Equity	15.09%	59.84%	51,493,481,253.54	-18.95%	26.09%	20	26	22	5	28	4	2	5	1	24	36	3
PTT PCL	PTT TB Equity	12.42%	41.23%	34,550,408,940.00	-2.10%	7.31%	15	20	18	15	9	1	8	9	9	5	32	1
MOL	MOL HB Equity	18.10%	30.32%	6,411,312,656.90	-14.19%	5.86%	22	14	8	7	6	6	14	19	1	2	42	8

Appendix 25: OPEC Countries

The Organization of Petroleum Exporting Countries (OPEC) is an intergovernmental organization of 14 nations, founded on September 14th, 1960. As of September 2018, OPEC accounted for an estimated 44% of global oil production and 81.5% of the world's proven oil reserves, giving OPEC a major influence on global oil prices.

OPEC - Member Countries

Country	Region	Proven crude oil reserves (million barrels) - 2018	Crude oil production (1,000 b/d) - 2018
Algeria	North Africa	12,200	1,040
Angola	Southern Africa	8,160	1,473
Congo	Central Africa	2,982	324
Ecuador	South America	8,273	517
Equatorial Guinea	Central Africa	1,100	120
Gabon	Central Africa	2,000	193
Iran	Middle East	155,600	3,553
Iraq	Middle East	145,019	4,410
Kuwait	Middle East	101,500	2,737
Libya	North Africa	48,363	951
Nigeria	West Africa	36,972	1,602
Saudi Arabia	Middle East	267,026	10,317
United Arab Emirates	Middle East	97,800	3,008
Venezuela	South America	302,809	1,510

Source: opec.org

Appendix 26: Discounted Cash Flow Assumptions

(i) Cost of Equity. The expected Cost of Equity was calculated using the Capital Asset Pricing Model (CAPM), through the following formula:

$$Re = RFR + \beta * MRP + CRP$$

BP AS A WHOLE		Assumptions
Risk Free Rate (RFR)	1.32%	Theoretical rate of return on an investment with zero risk. For the estimation, we used the average of the last 5 years of the 10-Year UK Government Bonds.
Company's Beta (β)	1.29	Measure of systematic risk of a security in comparisson to the market. For the estimation, we used two distinct methods: A) Pure-play method with Aswath Damodaran's calculations as in January 2019 for the Industry group "Oil/Gas (Integrated)" and B) Regression between the BP PLC stocks and the MSCI ACWI index.
Country Risk Premium (CRP)	0.38%	Additional return or premium to compensate for the higher risk associated with investing in a foreign country, compared with investing in the domestic market. For the estimation, we used the Aswath Damodaran's calculations as in January 2019, based on CDS spread.
Market Risk Premiun (MRP)	6.08%	Difference between the expected return on a market portfolio and the Risk-Free Rate. For the estimation, we used two distinct methods: A) Aswath Damodaran's calculations as in January 2019, based on CDS spread and B) Fernandez Survey (2019).
Cost of Equity	9.55%	Expected Cost of Equity using the Capital Asset Pricing Model - CAPM Model.

UPSTREAM SEGMENT		Assumptions
Risk Free Rate (RFR)	1.32%	Theoretical rate of return on an investment with zero risk. For the estimation, we used the average of the last 5 years of the 10-Year UK Government Bonds.
Company's Beta (β)	1.33	Measure of systematic risk of a security in comparisson to the market. For the estimation, we used two distinct methods: A) Pure-play method with Aswath Damodaran's calculations as in January 2019 for the Industry group "Oil/Gas (Production and Exploration)" and B) Regression between the BP PLC stocks and the MSCI ACWI index.
Country Risk Premium (CRP)	0.38%	Additional return or premium to compensate for the higher risk associated with investing in a foreign country, compared with investing in the domestic market. For the estimation, we used the Aswath Damodaran's calculations as in January 2019, based on CDS spread.
Market Risk Premiun (MRP)	6.08%	Difference between the expected return on a market portfolio and the Risk-Free Rate. For the estimation, we used two distinct methods: A) Aswath Damodaran's calculations as in January 2019, based on CDS spread and B) Fernandez Survey (2019).
Cost of Equity	9.77%	Expected Cost of Equity using the Capital Asset Pricing Model - CAPM Model.

DOWSTREAM SEGMENT		Assumptions
Risk Free Rate (RFR)	1.32%	Theoretical rate of return on an investment with zero risk. For the estimation, we used the average of the last 5 years of the 10-Year UK Government Bonds.
Company's Beta (β)	1.26	Measure of systematic risk of a security in comparisson to the market. For the estimation, we used two distinct methods: A) Pure-play method with Aswath Damodaran's calculations as in January 2019 for the Industry group "Oil/Gas (Distribution)" and B) Regression between the BP p.l.c. stocks and the MSCI ACWI index.
Country Risk Premium (CRP)	0.38%	Additional return or premium to compensate for the higher risk associated with investing in a foreign country, compared with investing in the domestic market. For the estimation, we used the Aswath Damodaran's calculations as in January 2019, based on CDS spread.
Market Risk Premiun (MRP)	6.08%	Difference between the expected return on a market portfolio and the Risk-Free Rate. For the estimation, we used two distinct methods: A) Aswath Damodaran's calculations as in January 2019, based on CDS spread and B) Fernandez Survey (2019).
Cost of Equity	9.39%	Expected Cost of Equity using the Capital Asset Pricing Model - CAPM Model.

OTHER BUSINESSES AND CORPORATE SEGMENT		Assumptions
Risk Free Rate (RFR)	1.32%	Theoretical rate of return on an investment with zero risk. For the estimation, we used the average of the last 5 years of the 10-Year UK Government Bonds.
Company's Beta (β)	1.29	Measure of systematic risk of a security in comparisson to the market. For the estimation, i used two distinct methods: A) Pure-play method with Aswath Damodaran's calculations as in January 2019 for the Industry group "Oil/Gas (Integrated)" and B) Regression between the BP p.l.c. stocks and the MSCI ACWI index.
Country Risk Premium (CRP)	0.38%	Additional return or premium to compensate for the higher risk associated with investing in a foreign country, compared with investing in the domestic market. For the estimation, i used the Aswath Damodaran's calculations as in January 2019, based on CDS spread.
Market Risk Premiun (MRP)	6.08%	Difference between the expected return on a market portfolio and the Risk-Free Rate. For the estimation, i used two distinct methods: A) Aswath Damodaran's calculations as in January 2019, based on CDS spread and B) Fernandez Survey (2019).
Cost of Equity	9.55%	Expected Cost of Equity using the Capital Asset Pricing Model - CAPM Model.

(ii) Cost of Debt. The expected Cost of Debt was calculated using the Credit Spread method, through the following formula:

$$Rd = RFR + \ Default\ Spread\ Country + Default\ Spread\ Company$$

Assumptions		
Risk Free Rate (RFR)	1.32%	Theoretical rate of return on an investment with zero risk. For the estimation, we used the average of the last 5 years of the 10-Year UK Government Bonds.
Default Spread Company	1.56%	For the estimation, we used the Synthetic Rating Method, through the average calculation of the Interest Coverage Ratio, based on Aswath Damodaran's calculations as in January 2019.
Default Spread Country	0.69%	For the estimation, we used the Adj. Default Spread of United Kingdom, based on Aswath Damodaran's calculations as in January 2019.
Cost of Debt	3.57%	Expected Cost of Debt using the Credit Spread method.

(iii) WACC. The expected Weighted Average Cost of Capital (WACC) was calculated through the following formula:

$$WACC = \frac{E}{EV} * Re + \frac{D}{EV} * Rd * (1 - Teffective)$$

BP AS A WHOLE	2020F	2021F	2022F	2023F	Terminal
Cost of Equity	9.55%	9.55%	9.55%	9.55%	9.55%
Cost of Debt	3.57%	3.57%	3.57%	3.57%	3.57%
Marginal Tax Rate	40.00%	40.00%	40.00%	40.00%	40.00%
After-tax Cost of Debt	2.14%	2.14%	2.14%	2.14%	2.14%
Weight of Equity	63.39%	62.97%	62.69%	62.25%	62.00%
Weight of Debt	36.61%	37.03%	37.31%	37.75%	38.00%
WACC	6.84%	6.80%	6.78%	6.75%	6.73%

UPSTREAM SEGMENT	2020F	2021F	2022F	2023F	Terminal
Cost of Equity	9.77%	9.77%	9.77%	9.77%	9.77%
Cost of Debt	3.57%	3.57%	3.57%	3.57%	3.57%
Marginal Tax Rate	40.00%	40.00%	40.00%	40.00%	0.00%
After-tax Cost of Debt	2.14%	2.14%	2.14%	2.14%	2.14%
Weight of Equity	63.39%	62.97%	62.69%	62.25%	64.00%
Weight of Debt	36.61%	37.03%	37.31%	37.75%	36.00%
WACC	6.98%	6.95%	6.93%	6.89%	7.03%

DOWSTREAM SEGMENT	2020F	2021F	2022F	2023F	Terminal
Cost of Equity	9.39%	9.39%	9.39%	9.39%	9.39%
Cost of Debt	3.57%	3.57%	3.57%	3.57%	3.57%
Marginal Tax Rate	40.00%	40.00%	40.00%	40.00%	0.00%
After-tax Cost of Debt	2.14%	2.14%	2.14%	2.14%	2.14%
Weight of Equity	63.39%	62.97%	62.69%	62.25%	64.00%
Weight of Debt	36.61%	37.03%	37.31%	37.75%	36.00%
WACC	6.73%	6.70%	6.68%	6.65%	6.78%

OTHER BUSINESSES AND CORPORATE SEGMENT	2020F	2021F	2022F	2023F	Terminal
Cost of Equity	9.55%	9.55%	9.55%	9.55%	9.55%
Cost of Debt	3.57%	3.57%	3.57%	3.57%	3.57%
Marginal Tax Rate	40.00%	40.00%	40.00%	40.00%	0.00%
After-tax Cost of Debt	2.14%	2.14%	2.14%	2.14%	2.14%
Weight of Equity	63.39%	62.97%	62.69%	62.25%	64.00%
Weight of Debt	36.61%	37.03%	37.31%	37.75%	36.00%
WACC	6.84%	6.80%	6.78%	6.75%	6.88%

(iv) Terminal Growth Rate. The expected Terminal growth rate (g) was calculated using the Stable Growth model, through the following formula:

$$Terminal\ growth\ rate = \frac{CAPEX - D\&A + \Delta NWC}{EBIT\ (1-t)} * ROE$$

Because BP has business at global level, we choose the real GDP growth – World as a proxy to correct the result obtained by the formula mentioned.

Terminal growth rate (g)		Assumptions
BP AS A WHOLE	1.25%	The terminal growth rate is a constant rate at which a firm's expected free cash flows are assumed to grow at, indefinitely. For the estimation, we used the Stable Growth Model, where it is assumed that g should be linked to CAPEX. Regarding with that, the Terminal growth rate results from the multiplication of Reinvestment Rate by ROE.
UPSTREAM SEGMENT	0.95%	
DOWSTREAM SEGMENT	1.36%	
OTHER BUSINESSES AND CORPORATE SEGMENT	0.83%	

(v) FCFF. The expected Free Cash Flow to the Firm was calculated through the following formula:

$$FCFFt = EBITt * (1-t) + D\&At - \Delta NWCt - CAPEXt$$

BP AS A WHOLE	2020F	2021F	2022F	2023F	Terminal
(+) EBIT * (1-t)	9,617.9	9,841.4	10,062.5	9,342.7	9,459.9
(+) D&A	14,988.3	16,506.1	17,836.5	19,053.2	19,627.4
(-) Δ NWC	-49.3	1,414.8	1,131.3	-1,336.9	-1,353.7
(-) CAPEX	16,713.6	17,560.2	18,449.6	19,384.1	19,627.4
(=) FCFF	7,941.9	7,372.5	8,318.0	10,348.7	10,813.7
WACC	6.84%	6.80%	6.78%	6.75%	6.73%
(=) Enterprise Value	192,793	g = 1.25%			

UPSTREAM SEGMENT	2020F	2021F	2022F	2023F	Terminal
(+) EBIT * (1-t)	6,658.6	6,581.8	6,848.0	6,303.2	6,363.3
(+) D&A	12,626.8	13,949.1	15,071.2	16,104.8	16,258.4
(-) Δ NWC	-4.4	127.7	101.9	-120.9	-122.1
(-) CAPEX	13,991.9	14,717.4	15,350.7	16,037.2	16,190.2
(=) FCFF	5,297.8	5,685.8	6,466.7	6,491.7	6,553.7
WACC	6.98%	6.95%	6.93%	6.89%	7.03%
(=) Enterprise Value	109,877	g = 0.95%			

DOWSTREAM SEGMENT	2020F	2021F	2022F	2023F	Terminal
(+) EBIT * (1-t)	4,416.1	5,015.8	4,874.3	4,643.6	4,706.6
(+) D&A	2,066.8	2,234.5	2,413.1	2,580.4	2,615.4
(-) Δ NWC	-44.7	1,280.2	1,023.1	-1,207.0	-1,223.4
(-) CAPEX	2,339.3	2,485.2	2,714.2	2,919.7	2,959.3
(=) FCFF	4,188.3	3,484.9	3,550.1	5,511.4	5,586.1
WACC	6.73%	6.70%	6.68%	6.65%	6.78%
(=) Enterprise Value	99,970	g = 1.36%			

OTHER BUSINESSES AND CORPORATE SEGMENT	2020F	2021F	2022F	2023F	Terminal
(+) EBIT * (1-t)	-1,456.8	-1,756.1	-1,659.8	-1,604.1	-1,617.4
(+) D&A	294.8	322.5	352.2	368.0	371.1
(-) Δ NWC	-0.2	6.9	6.4	-9.0	-9.1
(-) CAPEX	382.4	357.6	384.8	427.3	430.8
(=) FCFF	-1,544.2	-1,798.2	-1,698.8	-1,654.4	-1,668.1
WACC	6.84%	6.80%	6.78%	6.75%	6.88%
(=) Enterprise Value	-28,717	g = 0.83%			

Appendix 27: FCFE & DDM Analysis

(i) FCFE. This model is also suitable to value BP due to the relatively stable Capital Structure. The expected Free Cash Flow to the Equity (FCFE) was calculated through the following formula:

$$FCFEt = FCFFt - \ Interest\ Expense * (1 - t) + Net\ Borrowing$$

Regarding with the Terminal growth rate, the same estimate found in the FCFF calculation was used.

DCF - FCFE	2020F	2021F	2022F	2023F	Terminal
(+) FCFF	7,942	7,373	8,318	10,349	10,814
(-) Interest Expense * (1-t)	2,253	2,655	3,129	3,705	3,751
(+) Net Borrowing	4,160	4,336	4,522	4,717	4,776
(=) FCFE	9,849	9,053	9,711	11,361	11,839
Cost of Equity	9.55%	9.55%	9.55%	9.55%	9.55%
(=) Enterprise Value	143,474	g = 1.25%			

(ii) DDM. BP pays a stable dividend and foresees in its strategy the maintenance of its dividend policy. That said, this model is also suitable to value. We used a Tree-Stage Dividend Discount Model (DDM), applied H-Model through the following formula:

$$V0 = \frac{D0* (1+gL) + D0* H* (gS-gL)}{r - gL}, H = (high\ growth/2)$$

Terminal growth rate (g)		Assumptions
Real GDP growth (g_S)	3.54%	Demand for Oil &Gas is expected to peak between 2035 and 2040, BP is assumed to grow to Real GDP growth over na average period of 10 years. After having a more conservative stance, a decrease in the long-term growth rate is assumed.
Expected growth rate (g_L)	1.25%	
Transition Stage (H)	10	

DDM	2020F	2021F	2022F	2023F	Terminal
Total Dividend Distributed	8,601	8,874	9,156	9,447	9,565
Cost of Equity	9.55%	9.55%	9.55%	9.55%	9.55%
(=) Enterprise Value	140,440				

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Recommendation System

Level of Risk	SELL	REDUCE	HOLD/NEUTRAL	BUY	STRONG BUY
High Risk	0%≤	>0% & ≤10%	>10% & ≤20%	>20% & ≤45%	>45%
Medium Risk	-5%≤	>-5% & ≤5%	>5% & ≤15%	>15% & ≤30%	>30%
Low Risk	-10%≤	>-10% & ≤0%	>0% & ≤10%	>10% & ≤20%	>20%